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ਪੰਜਾਬ ਸਟੇਟ ਓਪਨ ਯੂਨੀਵਰਸਿਟੀ
ਪਟਿਆਲਾ

The Motto of Our University

(SEWA)

SKILL ENHANCEMENT

EMPLOYABILITY

WISDOM

ACCESSIBILITY

SELF-INSTRUCTIONAL STUDY MATERIAL FOR JGND PSOU

JAGAT GURU NANAK DEV
PUNJAB STATE OPEN UNIVERSITY, PATIALA

(Established by Act No. 19 of 2019 of the Legislature of State of Punjab)

BACHELOR OF ARTS

CORE COURSE (CC): ECONOMICS

SEMESTER- I

BAB31101T:MICRO ECONOMICS

Head Quarter: C/28, The Lower Mall, Patiala-147001
Website: www.psou.ac.in

The Study Material has been prepared exclusively under the guidance of Jagat Guru Nanak Dev Punjab State Open University, Patiala, as per the syllabi prepared by Committee of Experts and approved by the Academic Council.

COURSE COORDINATOR AND EDITOR:

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JAGAT GURU NANAK DEV PUNJAB STATE OPEN UNIVERSITY,PATIALA

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PREFACE

Jagat Guru Nanak Dev Punjab State Open University, Patiala was established in December 2019 by Act 19 of the Legislature of State of Punjab. It is the first and only Open University of the State, entrusted with the responsibility of making higher education accessible to all, especially to those sections of society who do not have the means, time or opportunity to pursue regular education.

In keeping with the nature of an Open University, this University provides a flexible education system to suit every need. The time given to complete a programme is double the duration of a regular mode programme. Well-designed study material has been prepared in consultation with experts in their respective fields.

The University offers programmes which have been designed to provide relevant, skill-based and employability-enhancing education. The study material provided in this booklet is self-instructional, with self-assessment exercises, and recommendations for further readings. The syllabus has been divided in sections, and provided as units for simplification.

The University has a network of 110 Learner Support Centres/Study Centres, to enable students to make use of reading facilities, and for curriculum-based counselling and practicals. We, at the University, welcome you to be a part of this institution of knowledge.

Prof. G S Batra
Dean Academic Affairs

BACHELOR OF ARTS

CORE COURSE (CC): ECONOMICS

SEMESTER - I

(BAB31101T) MICRO ECONOMICS

MAX. MARKS:100

EXTERNAL:70

NTERNAL:30

PASS:40%

CREDITS:6

OBJECTIVE:

This course acquaints the students with the basic principles of Microeconomics and economic activities. It will help the students to understand the subject by applying it to their day to day experiences.

INSTRUCTIONS FOR THE PAPER SETTER/EXAMINER:

1. The syllabus prescribed should be strictly adhered to.
2. The question paper will consist of three sections: A, B, and C. Sections A and B will have four questions each from the respective sections of the syllabus and will carry 10 marks each. The candidates will attempt two questions from each section.
3. Section C will have fifteen short answer questions covering the entire syllabus. Each question will carry 3 marks. Candidates will attempt any 10 questions from this section.
4. The examiner shall give a clear instruction to the candidates to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.
5. The duration of each paper will be three hours.

INSTRUCTIONS FOR THE CANDIDATES:

Candidates are required to attempt any two questions each from the sections A, and B of the question paper, and any ten short answer questions from Section C. They have to attempt questions only at one place and only once. Second or subsequent attempts, unless the earlier ones have been crossed out, shall not be evaluated.

Section - A

UNIT 1: Introduction of Economics, Theory of Demand and Supply

UNIT 2: Elasticity of Demand

UNIT 3: Consumer Behaviour: Utility analysis;

Unit 4: Consumer Behaviour: Indifference curve analysis.

Section - B

Unit 5: Production Function: Law of Variable Proportions and Returns to Scale

Unit 6: Concepts of Cost and Revenue: types, and shapes of cost curves in short and long periods; shapes of revenue curves in different market forms; relationship of AR, MR and Elasticity.

Unit 7: Perfect Competition: Firm and Industry Equilibrium

Unit 8: Imperfect Competition: Monopoly and Monopolistic Competition.

Suggested Readings:

1. A. Koutsoyiannis: Modern Microeconomics, Palgrave Macmilan.
2. N. Gregory Mankiw, Economics: Principles and Applications, India edition by South Western, a part of Cengage Learning, Cengage Learning India Private Limited, 4th edition, 2007.
3. Salvotore. D (2006) Theory and Problems of Microeconomic Theory. (3rd ed.) Tata McGraw-Hill Publishing Company Ltd.
4. Samuelson, Paul A and Nordhaus, William D: Economics, 18th Edition, Tata McGraw

   Hill Publishing Company Limited, New Delhi, 2006

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BACHELOR OF ARTS

CORE COURSE (CC): ECONOMICS

SEMESTER -I

BAB31101T: MICRO ECONOMICS

COURSE COORDINATOR AND EDITOR: DR. PINKY SRA

SECTION A

UNIT NO:	UNIT NAME
Unit 1	**Introduction of Economics, Theory of Demand and Supply**
Unit 2	**Elasticity of Demand**
Unit 3	**Consumer Behaviour:** Utility analysis;
Unit 4	**Consumer Behaviour**: Indifference curve analysis

SECTION B

UNIT NO:	UNIT NAME
Unit 5	**Production Function:** Law of Variable Proportions and Returns to Scale
Unit 6	**Concepts of Cost and Revenue**
Unit 7	Perfect Competition: Firm and Industry Equilibrium
Unit 8	**Imperfect Competition:** Monopoly and Monopolistic Competition.

BACHELOR OF ARTS

SEMESTER –I

COURSE: MICRO ECONOMICS

UNIT 1: INTRODUCTION OF ECONOMICS, THEORY OF DEMAND AND SUPPLY STRUCTURE

1.16 Suggested Readings

1.0 Learning Objectives

After reading this unit, learner will be able to:

- Describe the nature and scope of economics
- Identify the basic problems of the economy
- Determine the methodology of economics
- Know about the role of assumptions in economic analysis.
- Interpret the economic models
- Describe the consumer's behaviour towards a particular commodity
- Identify factors determining demand for a commodity
- Interpret the shifts in demand curve and movement among demand curve

1.1 Introduction

Economics is the study of how society manages its resources which are limited in nature. It also studies the economic activities of man. Everyone has to choose about the use of scare resources, so that they may get maximum satisfaction from them. Economists study how individuals, firms and other organisations make decisions about what commodities and quantities are produced, how these commodities are produced and who gets how much of the goods produced for consumption with the given limited resources.

1.2 Meaning of Economics

Economics, according to Adam Smith (1976), the father of economics, is "*an inquiry into the nature and causes of the wealth of a nation".* In his well-known work, "The Wealth of Nations", he expresses these views. According to him, economics enquires the factors that influence a country's wealth and growth. The subject matter of economics, according to this definition, is the production and expansion of wealth. Ricardo, on the other hand, moved the focus away from production of wealth to the distribution of wealth.

According to him, "*The produce of the earth-all that is derived from its surface by the united*

application of labour, machinery and capital is divided among three classes of the community, namely, the proprietor of the land, the owner of the stock of capital necessary for its cultivation and the labourers by whose industry it is cultivated". Thus, Adam Smith and Ricardo definition of economics considered economics as 'science of wealth'. However, according to Marshall, wealth is just a secondary consideration; the main focus of economic study is on man and his everyday activities. According to Alfred Marshall (1922), *"Economics is the study of mankind inthe ordinary business of life; it examines that part of individual and social actions which is most closely connected with the attainment and with the use of material requisites of well-being"*.

In his book "Principles of Economics", Marshall understood it in terms of "material welfare" material goods are those which can be touched and seen like chairs, books etc. and an analysis of man's behaviour in everyday life, but Robbins criticised Marshall's concept of economics. He believes that economics should not have any connection with material well-being. He emphasizes that we study not only material but also immaterial things in economics. He said under it we also investigate how the prices of immaterial services such as professional musicians, actors and actresses, dancers, and others are determined and these are important topics of price theory. As a result, Robbins not only criticized Marshall's idea of economics and other welfare definitions but also proposed a new definition that he believed to be more scientific and correct. In 1931, he published "An Essay on the Nature and Significance of Economic Science," which included this description. According to him, economics is the study of problems that occur as a result of resource scarcity. Nature has not supplied humanity with enough resources to meet all of its needs or wants. As a result, the people must decide how the money can be used and for what purposes.

According to Robbins, *"Economics is the science which studies human behaviour as a relationship between ends and scarce resources which have alternative uses."*

This definition is based upon the following three facts:

A. Man's wants are unlimited and all are of not equal intensity. Some are more intense than others; therefore, one is compelled to choose between the more urgent and less urgent wants.

B. even though wants are unlimited, the resources to satisfy them are strictly limited. It is important to note here that if resources like wants are unlimited then there will be no possibility of any economic problem because all wants could have to be fulfilled. It should

be carefully noted that according to this definition, resources here refer to natural productive resources, consumer goods, man-made capital goods, time available with man and financial resources, etc.

C. The third fact is that scarce resources can be put to alternative uses. Here alternative uses have an example of milk. As milk is used for different purposes such as curd, butter and cheese etc. These alternate uses are of varying significance, with some being more urgent than others. It means we must choose the use to which resources have been employed. Thus, the problem of choice comes in.

It is observed from Robbins's definition of economics that economics is a science of choice. Although Robbin's definition of economics is considered superior because of above mentioned three facts, it should not be termed as perfect. It is criticised because it does not cover the theory of income and employment determination as well as the theory of economic growth. Thus, all three essential subjects of economics, namely the distribution of national income and production, the determination of national income and employment and the theory of economic growth, must be included in a proper definition of economics. Prof. Samuelson defines economics as, *"the study of how societies use scarce resources to provide valuable commodities and distribute them among different people*". Thus, according to this definition, economics is the study of scarcity of resources and choice and distribution of national product among people of a society.

1.3 Nature and Scope of Economics

Economics as a subject is experiencing continuous growth. A discussion on the scope of economics includes the definition of economics, whether economics is an art or a science and whether it is a positive or a normative science.

There has been a lot of controversy among economists about the true scope of economic theory or its subject matter. Various economists have defined the subject matter of economics. Like Adam Smith defined it as, *economics inquiries into the nature and causes of the wealth of nations.* Ricardo defined economics as, *"how the produce of the earth is distributed"*, that is economics deals with the distribution of income and wealth. A.C. Pigou says, *"Economics studies that part of social welfare which can be brought directly or indirectly into a relationship with the measuring rod of money"*. Whereas Gustav Cassel defined economics as dealing with markets, prices and market exchange. Robbins has defined economics as a study of the allocation of scarce resources among competing ends or uses. The scope of economics

has been divided into the following fields: Microeconomics and Macroeconomics and Positive Science and Normative Science

It is evident from figure 1.1 that economics as a social science has two main branches.

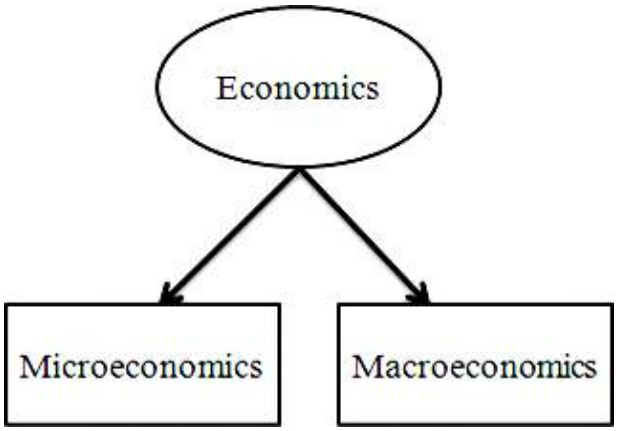


Figure 1.1

(i) Microeconomics

The word micro comes from the Greek word *mikros*, which means "small". As a result, it focuses on the study of small individual units of the economy such as individual consumers, individual firms and small groups of individual units like various industries and markets. To put it another way, microeconomics is the study of how individual consumers choose which goods and services they want to buy and how they share their limited income among those goods and services to maximize their overall welfare.

The microeconomics has some important components:

A. It analyses how a consumer allocates his income to different uses so that maximum satisfaction can be derived. An inverse price-demand relationship is the outcome of the theory of demand.

B. It examines how a producer decides what to produce, how to produce and how much to produce. The main motive of a producer is profit maximization.

C. It studies how prices of goods are determined in the market through the interaction of supply and demand forces.

Thus, microeconomics is helpful in the formulation of economic policies that will promote the welfare of the society. It tells us how goods and services produced are distributed among the different people for consumption through price or market mechanism.

(ii) Macroeconomics

The word macro comes from the Greek word *macros,* which means "large". As a result, macroeconomics is concerned with the overall analysis of the economy. It studies the behaviour of large aggregates such as total employment, the national product or income and the economy's overall price level. According to K.E. Boulding, *"Macroeconomics deals not with individual quantities as such but with the aggregates of these quantities; not with individual incomes but with the national income; not with individual prices but with the price level; not with individual output but with the national output"*.

It is important to mention here that each definition given above is incomplete and inadequate since they do not indicate the true scope and subject matter of economics. It is a controversial subject whether economics is a science or an art or both.

(iii) Economics as a Science

Science refers to a systematised body of knowledge. It deals with the cause-and-effect relationship. It helps us in drawing generalisations in the form of principles or laws. Some of the economists believed economics as science because it is a systematised body of knowledge that studies and analyses economic data. The law of demand, for example, states that, all other factors being held constant, a decrease in price leads to a rise in demand and increase in price leads to decrease in demand. It can be understood from the law of demand that increase or decrease in price is the cause while the decrease or increase in demand is the effect of the same.

Economics is a science and its principles, such as the law of demand and the law of diminishing marginal utility, are universally true. Some argue that economics is not a science because in science we are doing experiments; however, in economics there is no scope of any kind of experiment. It means in science we are collecting facts and putting them to the test through experimentation. Statistical, quantitative and econometric methods for research are used in economics, but they are not always effective in determining the true validity of economic laws and theories. Consequently, precise quantitative forecasting is impractical. Economic phenomena are complicated because they include man acting irrationally as a result of society's tastes, habits, social, and legal institutions. For example, a price increase may not result in a decrease in demand, but rather an increase in demand because there are some other factors which affect the demand of the commodity like taste and preferences of the consumers and future expectations. If consumers are expecting that in future, there will be shortage of the commodity then in the present time period they will increase the demand. Thus, economic

phenomenon's are complicated because consumers are behaving irrationally. However, from the above we cannot say that economics is not a science. It is a social science which deals with human beings.

Now an important question emerged from the above discussion, whether economics is a positive science or a normative science. Prof. Robbin's and Freight-men thought of economics as a positive science, while Prof. Pigou and Marshall thought of it as a normative science.

(iv) Positive Science: It may be defined as a body of systematized knowledge concerning what it is, what was and what ought to be. Thus, positive science deals with economic problems related to the past, present and future. We are analysing economic conditions with the help of facts and figures. Positive statements have a few distinguishing features like:

(i) These statements highlight the nature and extent of economic problems.

(ii) These are based on facts and figures related to the past, present or future.

(iii) It is not necessary that these statements are based on truth. These may be true or false but are verifiable for truth.

(iv) These do not reflect any value judgment or opinion of the economists.

Let us understand economics as positive science with the help of an example. If someone says that the population of India is more than China, it is a positive statement, but it is wrong as per population statistics.

(v) Normative Science: It is concerned with economists' opinion or value judgments to understand the economic problem. Different economists have different opinionson how to solve any economic problem. These opinions are often based on value judgments. It is concerned with the question of '*what ought to be'*. As a result, when an economist suggests a solution to a problem in normative economics, they do it based on people's ethics and beliefs rather than scientific rules and principles. The normative statements also have some essential characteristics:

- These statements involve value judgment.
- These statements may create controversies and debates.
- Because these statements are based on opinions, it is impossible to verify the truth.
- These statements are related to 'what ought to be' as a solution to any economic issue.

For instance, if someone says that the government should spend more on health care. Then it

is just an opinion or value judgment.

(vi) Economics as an Art

According to Prof. Pigou and Marshall, Economics is an art. Art is generally considered as practical implementation of knowledge for achieving particular goals. In other words, Art is an action and an art of application of scientific laws in practice. As a form of art, economics is useful in solving many of the economic issues that arise in the economy. Economics is considered as an art because in these different theories and laws are explained with the help of tables, graphs, statistics and equations. Besides this, assumptions are also used in economics which are helpful to describe the conditions under which theories, rules and relationships between economic variables can be applied.

Thus, from the above discussion we can say that economics is considered as a science (social science) as well as an art too.

Check Your Progress- I

Q.1 Define Robbin's definition of economics. How is it superior to Marshall's definition?

Ans_____

_____

Q.2 Define Micro Economics.

Ans_____

_____

1.5 Basic Economic Concepts of Economics

A. **Scarcity:** The existence of an economy is based on two fundamental facts. To begin with, human wants for goods and services are unlimited; nevertheless, resources to produce goods and services are scarce. As a result, the first economic lesson is scarcity. We can't satisfy all of our wants and desires by producing what we want because our wants are unlimited and resources are scarce. It means that one must decide how to utilize scarce resources to get maximize satisfaction.

B. **Choice:** Because it is impossible to satisfy all the desires with limited resources, each society must decide a method for determining which desire is to be satisfied. The necessity for economizing arises because we have limited productive resources at our disposal, such as land, raw materials, skilled labour, capital equipment, and so on. Because these

resources are in limited supply, the goods they may produce are also limited. As a result, goods are scarce due to a scarcity of productive resources. We should make the most of what we have because our resources are limited in comparison to our desires.

In economics, it is thought that man is rational in his decision-making; that is, if a man has to pick between two options, he will always pick the one that will provide the greatest satisfaction as compared to other available choices. Similarly, if a firm had to choose between producing one product or another, it would choose the product with the highest profit margin. The scale of choice displays a list of desires ranked from most urgent to least urgent, with the most urgent want listed first, followed by the second most urgent and so on.

Figure 1.2 The Economic Problem

Figure 1.2 depicts the problem of choice that results from unlimited wants on the one side and limited resources on the other. The study of economics teaches us how to use and allocate limited resources to obtain maximum possible satisfaction for the people.

There are many types of resources that assist us in producing goods and services. They are called factors of production. Economists divide factors of production into four categories.

Figure 1.3 shows that there are four types of factors of production. The ability of all these factors is limited in supply. Thus, these limited means are put in a constraint on the amount of goods and services that can be produced.

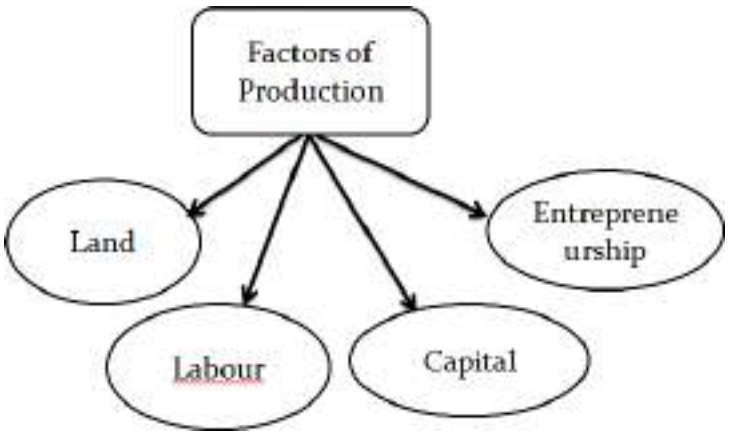


Figure 1.3 Kinds of Resources

a. **Land**: It refers to all natural resources that are a free gift from nature. It includes not only agricultural soil, but also other natural resources like minerals, water, climate and forests.

b. **Labour:** Both physical and mental skills that individuals can make available to produce goods and services are referred to as labour.

c. **Capital:** It refers to man-made resources of production. This includes machinery, factory-buildings, various tools and devices, roads, dams, transport buses and trucks etc.These are often referred to as capital goods because they help in the production of additional goods and services.

d. **Entrepreneurship:** Entrepreneurship denotes a unique human capital that possesses entrepreneurial potential. In a free market economy, entrepreneurs play an important role. By combining other tools such as labour, land and capital, he initiates and organises the production process. Entrepreneurs make a variety of corporate policy decisions and are exposed to the risk of failure as a result of their actions.

1.5 Basic Economic Problems of an Economy

As mentioned in the previous pages, a lack of resources in relation to human wants leads to various basic problems, concerns and questions that an economy must address if it is to achieve its goals. The basic economic problems are also called central problems of the economy. Many of these issues include societal decision-making. As a result, economic theory must respond to five basic questions. These are explained as follow:

(A)The Problem of Allocation of Resources

The first and foremost basic problem confronting an economy is “what to produce" so as to

satisfy the wants of the people. The problem of what goods are to be produced and in what quantities arises directly from the scarcity of resources. If the resources were unlimited, the problem of what goods are to be produced would not have arisen because in that case we should have been able to produce all goods we wanted and also in the desired quantities. But because resources are in fact scarce relative to human wants, an economy must choose among various goods and services. If the society decides to produce a particular good in a larger quantity, it will then have to withdraw some resources from the production of other goods and devote them to the production of the goods which are to be produced more.

(B) Choice of a Production Method

It is related to the question 'how to produce' which means what technique or method will be used by society to produce goods. Here the problem is how to determine optimum combination of inputs i.e., labour and capital- so that production of goods and services is maximised. This problem too arises due to the scarcity of resources. Any quantity of labour and capital could be combined to produce a product if inputs (labour and capital) were available in unlimited amounts. Resources, on the other hand, are not available in unlimited quantities. As a result, selecting a technology that makes the most efficient use of resources becomes a necessity.

A number of alternative techniques are available with the help of which a given quantity of a commodity can be produced. As a result, the society must select between them which alternative methods should be used to produce goods. Each technology is using a different combination of resources such as labour and capital. For example, more labour and less capital is needed to produce cloth with handlooms whereas in automatic looms more capital and less labour isneeded. It means production of cloth with handlooms is a labour-intensive technique while with automatic looms is a capital-intensive technique. Thus, a society has to choose whether it wants to produce with labour intensive methods or capital-intensive methods of production. It is important to mention here that in the choice of a technique of production prices of different factors play an important role.

As a result, a society must decide whether it wants to produce the commodity by using labour-intensive or capital-intensive methods. It is important to note that prices of various factors play an important role in the selection of a technique of production.

(C)The Problem of Distribution of National Product

This problem is related to the sharing of the national product. It means among the members of the society how the national product is to be distributed. Since the productive resources and the

output obtained through these resources are scarce, we are unable to satisfy all the wants of all the people of a society. As a result, it should be decided by society who should obtain how much from the total production of goods and services. Who gets how much of the national production in a free market economy is determined by the people's money income? The higher a person's money income, the more items he or she would be able to purchase from the market. As a result, people with higher incomes receive a larger share of the economy's production than those with lower incomes. More the equal distribution of income higher will be the possibility of equal distribution of national product.

It is important to keep in mind that an individual can earn money income in two ways. Firstly, it can be obtained by work, i.e., by selling its labour services. Income received through wages and salaries included under this. Secondly, property such as land, factories and other sources of capital can also make money income. Rent, interest and profits are all examples of income from property. In a free market economy, variations in ownership of property lead to differences in income from property.

The distribution of national product in the economy has always been a hot topic of economics. According to Karl Marx, national product should be distributed based on "from each according to his ability, to each according to his needs". Another significant viewpoint is that each individual should be compensated in proportion to his or her contribution to national production.

The Problem of Economic Efficiency

This is related to the problem of efficiency or welfare maximisation. Since the resources of an economy are limited, there will be no wastage of these resources. In the preceding pages, we have discussed what and how goods are produced in the economy. Apart from that we have also studied how national product is distributed. Now, the question which emerged is whether the production and distribution decisions made by an economy are efficient. If the productive resources are utilised in such a way that there will be no sacrifice of one good for producing more of another good, then we can say that production is efficient. For this, we have to do the cost benefit analysis when we are making any change. Thus, when there is a shifting of resources from one use to another use will take place in an economy then it will also involve some cost. If the involvement of cost is more than the benefits received from it then it is not worthwhile to shift the resources.

Since resources are limited, it is preferable to use them as effectively as possible.

(D)The Problem of Economic Growth

If all the scarce resources of an economy are used for current consumption (for producing consumer goods) only then there will be no provision of resources for capital goods, therefore, the productive capacity of the economy will not increase in future. As a result, the living standard or income of the people will remain stagnant. To encourage economic growth, a part of resources should be allocated to the production of capital goods and for promotion of research and development activities that will bring technical advancement. The provision for capital accumulation and technological advancement, on the other hand, implies some sacrifice of current consumption. As a result, a society must decide how much saving and investment it can make for future economic progress.

From above, it is clear that when an economy's productive capacity is increasing, increasingly more goods and services will be produced, resulting in an increase in people's living standards.

Thus, we can say that it is only the scarcity of economic resources that lurks behind all of the above fundamental questions. These five questions are merely a breakdown of the basic economizing problem of scarce resources and unlimited wants. Also, the interrelation of these questions is apparent, so they demand simultaneous treatment and we cannot treat them independently.

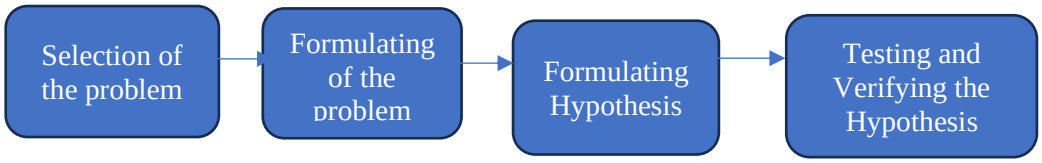
1.6 Methodology of Economics

Our findings must be logical, accurate and reliable based on appropriate methods of analysis to develop economics as an objective and impartial subject of research. We will discuss two methods in this section, namely Deductive and Inductive methods.

1.6.1 Deductive Method

FThis approach was primarily used by classical economists. It is also known as a priori, hypothetical or an abstract approach of economic analysis. It is a method of reaching conclusions based on specified general axioms. In this method, we can derive conclusions from a collection of facts by applying logic, which establishes the relationship between causes and effects of a specific action. To be precise, deduction can be described as reasoning from general premises to specific conclusions. Premises are those statements which are assumed to be true and applicable to a particular issue. It is generally believed that right decisions will result from proper reasoning.

Steps involved in the deductive method



Merits of Deductive Method

The merits of the deductive method are as follows.

A. It is based on general principles, such as the law of diminishing returns; therefore, this method is useful in drawing inferences which have universal validity.

B. When used correctly, this method is the most effective technique of discovery. This approach is useful for obtaining critical outcomes.

C. Principle of logic is applied here, and the results obtained by the deductive approach are simple, accurate and well established.

D. This approach is easy to use because it does not necessitate a thorough examination of statistical evidence for a specific case. As a result, results obtained by using this approach are impartial since they are not influenced by the investigator's personal beliefs.

E. This method can be used to predict economic trends.

Demerits of Deductive Method

There are several demerits of deductive method:

A. The problem with the deductive approach becomes worse as laws based on unrealistic assumptions are assumed to be universal, since they are often based on unrealistic assumptions, such as perfect competition in the market. Thus, this method is considered as a static method.

B. It is believed by some economists that the laws based on deduction are imaginary and unreal because they do not take into account the factors like technology, political system, social customs and religion etc. which are changeable in nature and highly influencing the economic facts.

C. In economics, observation is used to verify theories, generalisations and laws. The proper observation necessitates accurate and sufficient data. Ifa hypothesis is derived from inaccurate or insufficient data, the theory will not match the fact and will be disproved.

D. The deductive approach is very abstract, and it takes a lot of expertise to make inferences

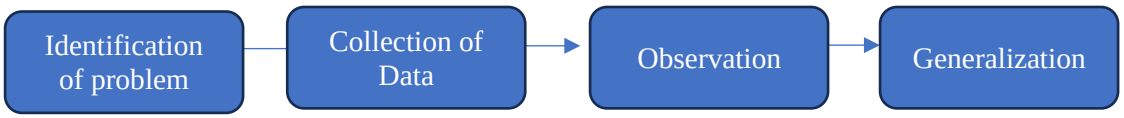
from different premises. Even in the possession of an experienced economist, using this approach is problematic due to the complexities of such economic issues.

1.6.2 Inductive Method

The method of reasoning from a part to the whole, from particulars to generals, or from the entity to the universal is known as induction. It's "an ascending operation," according to Bacon, in which facts are gathered, sorted, and then general conclusions are drawn.

In economics, the inductive approach was used by the German Historical School, which aimed to improve economics entirely through historical study. The historical or inductive approach assumes that the economist is essentially an economic historian who must first collect data, draw generalisations and then test the conclusions by using them to subsequent events. It means, we are using statistical methods to find out the actual solution to any economic issue.Since we draw the conclusions only after considering the changing circumstances in detai from all angles, this approach is called concrete, logical and functional.

Steps Involved



Merits of Inductive Method

Following are the merits of this method:

1) This method is considered as dynamic because in these changing economic phenomena can be analysed with proper experience, therefore, appropriate conclusions can be drawn which will be further useful to provide appropriate solutions to the economic problem.
2) As it is based on facts, so it is more realistic in nature.
3) This method is also useful in future enquiries.
4) Besides the above-mentioned merits, it is helpful for the government to formulate economic policies at the micro and macro level.

Demerits of Inductive Method

The demerits of inductive method are:

1) As compared to the deductive method, the implementation of this method is quite difficult. If a person is having adequate knowledge of statistical techniques, then he can use this

method. It means vast knowledge of the investigator is needed in this method.

2) This method is very costly and time consuming.

3) To obtain precise results and make their use universal, the area of observation and experimentation must be broad, which is not the case with the inductive method.

From the above discussion, it can be said that these two methods are not contradictory to each however, to get appropriate results these two can be used as supplementary to each other. Economists use these methods singly or in combination when analysing problems, depending on the type of the problem to be analysed. As a result, inductive and deductive methods are equally important for economic analysis. Thus, a combination of both the methods will lead to true progress in economic enquiries.

Check Your Progress-II

Q.1 Scarcity is the mother of all economic problems. Discuss it.

Ans_____

_____

Q.1 Distinguish between Deductive and Inductive methods.

Ans_____

_____

1.7 Role of Assumptions in Economic Theory

In economic theory, however, the assumptions are always viewed negatively. But one cannot deny the role played by these assumptions. Let us discuss the numerous beneficial roles of these assumptions in economic theory:

1) Assumptions are a cost-effective way of describing or presenting an idea.

2) Some people and a number of items are involved in economic analysis. Studying every man is a challenging task. So, after examining numerous types of men and various types of things, we form generalisations about the category as a whole. In our models, for example, we commonly state that only two items are produced. It does not imply that we only produce two types of goods in the real world; rather, it means that we produce two types of goods such as capital goods or consumer goods. As a result, we can simplify our study by just establishing assumptions. As a result, we can conclude that assumptions result in simplification.

3) Assumptions are considered as a convenient way of stating the conditions under which the validity of a theory is tested.

4) Generally speaking, the real economic scene is not stable; it is changeable in nature. Because of this, we cannot make changes in our economic models so quickly which would make our analysis invalid. For example, in the theory of demand we take the example of 'ceteris paribus' (i.e., other thing remaining the same). This would simplify our study, and its validity could be evaluated using the assumptions provided.

5) In economics, we are commonly using the assumption of rationality of an individual. It is important to mention here that different people have different tastes and preferences, their own peculiarities and their own biases. They cannot all be treated separately. To do so, we must assume that economics is concerned with the average man rather than a specific individual. Due to this, an individual is commonly assumed to be a rational being. As a result, by assuming an average and rational man, we eliminate the possibility of exceptions to the provided economic laws.

In economics, every law and generalisation are based upon some assumptions. The concern now is whether these assumptions should be realistic or not to formulate proper economic laws. According to one viewpoint, economic laws, if they are to be valid and useful, must be based upon assumptions which are realistic. As a result, drawing unrealistic assumptions and establishing laws on their basis, according to this viewpoint, will make the laws invalid. Prof. Milton Friedman, on the other hand, argues the same in his well-known paper, "The Methodology of Positive Economics". He claims that the predictions of positive economics must be checked with empirical evidence, even though the assumptions taken might be unrealistic. Assumptions, he claims, cannot be realistic since they are created solely to simplify the analysis.

1.8 Economic Models

A model is a simplistic version of a theory. In other words, a model is a part of a theory that represents a cause-and-effect relationship in a specific economic phenomenon. Words, diagrams, and mathematical equations are often used to express these concepts. The terms model and theory are often used interchangeably since both are designed to describe the relationship between variables. An economic model, on the other hand, is a formal statement of a theory, commonly represented as a series of equations or graphs. When economic models merely define a general relationship between variables without specifying the exact

relationship, they are said to be "general." A general model of demand, for example, is one that states that as the price of a good increase, the quantity demanded decreases. Quantitative models are those that explain a quantitative relationship between variables. Models are created by economists to analyse and forecast economic events. Economists have developed mathematical methods to analyse and forecast the behaviour of an individual consumer, producer or the economy as a whole. A model is made up of several assumptions that are used to draw conclusions or consequences.

There are two points to keep in mind about the analytical economic model. Firstly, a model should always abstract from reality. Secondly, an empirical economic model is made up of a collection of equations or graphs that depict the cause-and-effect relationship. Figure 1.5 shows these two important attributes of the economic model.

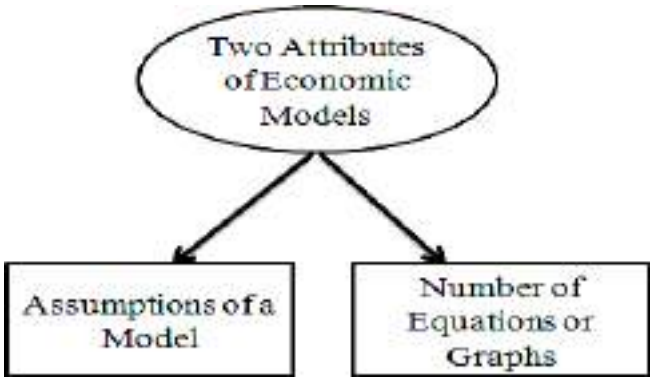


Figure1.5 Attributes of Economic Models

A. Assumptions of a Model: An economic model is often dependent on certain assumptions that do not accurately represent real-world economic conditions. While the assumptions used to construct a model must be related to the type of situation being analysed and explained, they do not have to be a replica of the real-world situation. Only the most important aspects of the modern economic world are represented in a model. In reality, the real world is so dynamic that understanding it necessitates abstraction and simplification. To bring out any useful and practical features of reality, one must abstract from it to some extent. However, in several respects, a model is not a total abstraction from reality to concentrate certain aspects of reality that are important and useful for understanding the behaviour of an economic unit, consumer or producer.

However, caution should be taken in this respect. We should avoid oversimplifying so that the model we build does not provide a skewed representation of real-world phenomena. As a result,

economic models should be built in such a manner that only irrelevant and insignificant considerations and factors are ignored

B. Equations or Graphs and Economic Models: An economic model is usually made of a series of equations or graphs that express the relationship between variables related to the problem under investigation. Each equation tries to explain the behaviour of a single variable, attempting to create a cause-and-effect relationship for that variable.

A key question now is why economists are interested in developing models. Economic models are created for analysis and prediction. Analysis implies how adequately we can explain the behaviour of an economic unit, consumers or producers. Prediction, on the other hand, refers to a model's ability to predict the effects of changes in some magnitudes in the economy. A model's usefulness may be determined by its explanatory or predictive power, the realism of its assumptions or the scope of its applicability. The most critical attribute of a model, according to Milton Friedman, is its predictive ability or how well it can forecast the behaviour of an economic unit. The critical characteristics of a valid and satisfactory model, according to Paul Samuelson, are the realism of assumptions and the analytical power of the model to describe the behaviour of economic agents, consumers or producers.

It should be remembered that economists generally believe that the most important attribute of a model is its purpose, that is, whether the model maker wishes to use it to forecast the effect of a change in a variable or to analyse and describe the particular behaviour of an economic agent.

1.9 Meaning of Demand

The demand for a good is the amount of it that a consumer can purchase at various given prices during a period. In economics, demand plays a vital role. Consumers' demand for goods and services is the driving force behind all economic activities. Producers tend to invest in production lines where demand for the output is high and consistent so that they will make more profit.

According to Ferguson, "*Demand refers to the quantities of a commodity that the consumers are able and willing to buy at each possible price during a given period, other things being equal.*"

In the context of Utility and Demand, goods are in demand because they satisfy people's wants. The amount of satisfaction an individual derives from consuming a good is referred to as utility. It means the want-satisfying power of a commodity is called utility. The utility of a good is an

essential determinant of a consumer's demand for it. A person's desire for a commodity is determined by the utility he intends to derive from it. Therefore, the greater the expected utility derived from a commodity, the greater the desire for it. Alcohol and cigarettes, for example, can be harmful to people, but they serve a purpose for those whose wants they satisfy.

Next, it is important to distinguish between the demand for a commodity and the quantity demanded. Demand refers to the quantities of a commodity that consumers plan to purchase at different prices of a commodity during a period of time whereas quantity demanded refers to the amount of a good or service that consumers plan to buy at a specific price. It should be carefully noted here that the quantity demanded is not always the amount actually purchased by consumers. The quantity demanded is often greater than the quantity of the goods available, as a result, the quantity of the good purchased is less than the quantity demanded of it.

It is worth mentioning that demand for a good is determined by some factors like tastes and preferences of the consumer for a commodity, income of the consumer and the prices of related goods, etc. If a change occurs in any of the above mentioned factors, then the demand of the consumer for a good will change.

1.10 Demand Function

The demand function for a commodity describes the relationship between the quantity demanded of that commodity and the factors that affect it. Individual demand for a commodity is determined by its price, income, the prices of related goods, tastes and preferences and the amount of advertising expenditure made by the producer on that commodity. Thus, the individual demand function for a commodity can be expressed as:

$Qd = f(Px, Y, Pr, T, A)$

Here, P_X= Own price of the commodity X

Y = Income of the consumer

P_r= Prices of related commodities

T = Tastes and preferences of the individual consumer

A= Advertising expenditure made by the producers on that commodity.

For several purposes in economics, it is useful to concentrate on the relationship between the quantity demanded of a commodity and its price while keeping other factors such as the consumer's income, the prices of other commodities and his tastes and preferences. With this,

we can write an individual's demand function as follows.

$Q_d = f(P_X)$

This means that the quantity demanded for a good X is a function of its own price, when all other determinants are held constant. Therefore, there is an inverse relationship between price and quantity demanded of a commodity.

(A) Demand Schedule

A demand schedule shows the various amounts of a good that a buyer is willing to purchase at various possible prices of that good at a given time. It can be studied as:

- Individual Demand Schedule
- Market Demand Schedule

(I) Individual Demand Schedule: An individual demand schedule is a table that shows the quantities of a given commodity that an individual consumer can purchase at all possible prices at a given time. The demand schedule of an individual consumer can be explained with the help of a table.

It will be seen from this demand schedule that as the price of a commodity rises, its quantity demanded will decline. When the price of a commodity is Rs. 10, the consumer purchases 50 units of the commodity and when the price goes up to Rs. 50, the consumer has reduced the quantity demanded of the product i.e., 10 units.

Table 1 Individual Demand Schedule

Price (Rs.)	Quantity Demanded (Units)
10	50
20	40
30	30
40	20
50	10

(II) Market Demand Schedule: For the determination of price of a commodity the information related to the size of total market demand for the commodity is very essential. Besides the factors which are affecting an individual's demand (price of a product, his income, prices of related commodities, and individual's taste and preferences), market demand for a commodity depends on an additional factor i.e., the number of consumers. However, the number of consumers depends on the population of a region or city who consume that

commodity. Thus, in every market there are a number of consumers of a commodity. The schedule which shows the quantity demanded by all the consumers of a commodity collectively at its different prices is called market demand schedule. Market demand schedule defined by Liebhafsky as *"Market demand schedule is defined as the quantities of a given commodity which all consumers will buy at all possible prices at a given moment."*

The market demand schedule for oranges can be shown with the help of Table 2. It describes that the market demand can be obtained by adding together the amounts of the commodity which individual consumers wish to buy at each price. Suppose, there are three consumers of a commodity in the market. Thus, at price of Rs.5, individual A wishes to buy 100 units; individual B wishes to buy 75 units; individual C wishes to buy 25 units of the oranges. The total quantity of the oranges that the three individuals plan to buy at price of Rs. 5 is therefore 100 + 75+25 = 200. Now as the price decreased to Rs. 1, individual A wishes to buy 800 units; individual B wishes to buy 450 units; and individual C wishes to buy 250 units of the oranges. Thus, the total quantity of the oranges that the three individuals plan to buy at price Rs. 1 is therefore 800+450+250 =1500. Thus, market demand for a commodity is the total demand of all the individuals towards a particular commodity.

Table 2 Market Demand Schedule of Oranges

Price (Rs.)	Demand of A	Demand of B	Demand of C	Market Demand (Units) A+B+C
5	100	75	25	200
4	200	150	50	400
3	400	200	100	700
2	550	300	150	1,000
1	800	450	250	1,500

(B) Demand Curve

A demand curve is a graph that shows the relationship between various quantities demanded at various possible prices for a commodity. According to Leftwitch, *"The demand curve represents the maximum quantities per unit of time that consumers will take at various prices".* Like demand schedule, demand curve also has two aspects: Individual Demand Curve and Market Demand Curve

(I) Individual Demand Curve: An individual demand curve shows various quantities of a good demanded by an individual consumer at different prices. The individual demand schedule can be shown with the help of a figure. In figure 1, on X-axis quantity demanded and on Y-axis, the price has been shown. DD is the demand curve.

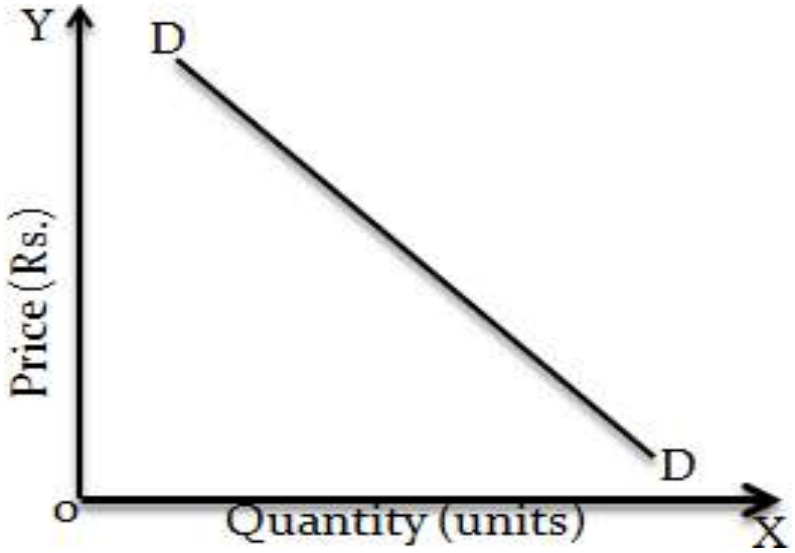


Figure 1

Each point on this demand curve shows the relationship between price and demand. The slope of the demand curve is downward sloping from left to right, which shows an inverse relationship between price and quantity demanded of the commodity.

(II)Market Demand Curve: The market demand curve for the good can be obtained by joining all the points showing the amounts demanded of the good by all the individuals at various prices. If we assume that there are three individuals in the market for a good. Then the market demand curve can be a horizontal summation of demand curves of these three consumers. The market demand curve also slopes downward to the right. It is worth noting that when the price of a commodity falls, new consumers are more likely to join the market and will further increase the quantity demanded of the commodity.

The market demand curve can be shown with the help of a figure. In Fig. 2, quantity demanded of oranges has been shown on X-axis and price on Y-axis. Since the market demand curve is the horizontal summation of individual demand curves, italso slopes downwards.

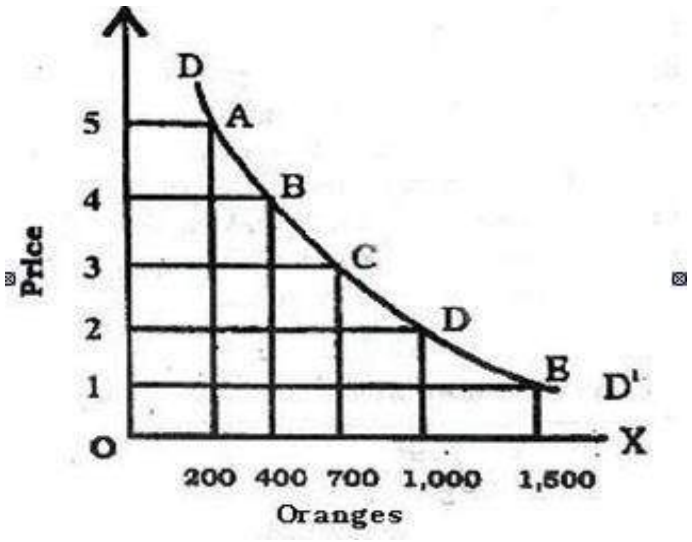


Figure 2

Check Your Progress-I

Q.1 What is the meaning of the term demand in economic? How it is different from desire and quantity demanded of a commodity?

Ans:_____

_____

Q2. Define Demand Function. Ans.

Ans:_____

_____

1.11 The Law of Demand

The law of demand is the most important law of economics theory which provides important information about demand. The functional relationship between price and quantity demanded is expressed by this law of demand. According to the law of demand, other things being equal, if the price of a good falls, the quantity demanded of it will increase, and if the price of the commodity increases, its quantity demanded will decrease. As a result, the law of demand states that there is an inverse relationship between price and quantity demanded, all other things being equal. Other things that are assumed to be constant are the income of the consumer, tastes and preferences of the consumer and the prices of related goods. If any change occurred in above mentioned factors, then the inverse relationship between price and quantity demand may not hold good. The following demand function can be used to illustrate the law of demand:

$Dx = f(Px, Pr, Y, T, E)$

Here, D_X= Demand for commodity-X, P_X= Own price of commodity-X, P = Price of related commodities, Y= Income of the consumer, T =Tastes and preferences of the consumers and E = Expectation of the consumer.

According to Prof. Samuelson, *"Law of demand states that people will buy more at lower prices and buy less at higher prices, ceteris paribus, or other things remaining the same.* "According to Prof. Marshall, *"The law of demand states that the amount demanded increases with a fall in price and diminishes when price increases, other things being equal."*

1.11.1 Assumptions of Law of Demand

The law of demand holds good when "other things remain the same". It means factors influencing demand, other than the price of the commodity are assumed to be constant.

1) No change in the price of related goods.
2) No change in the income of the consumer.
3) No change in the tastes and preferences of consumers.
4) The consumer does not expect any change in the price of the commodity soon.

According to the law of demand, there is an inverse relationship between a commodity's own price and its demand; however, this relationship is not proportional. It is important to note here that the law of demand

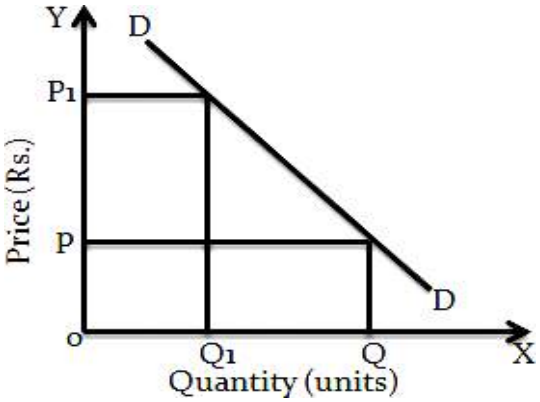


Figure 3

indicates only the direction of change in demand as a result of change in its own price. Inverse relationship between price and demand can be seen in the figure no. 3.

It is evident from the figure that on X-axis quantity demanded and on Y-axis price of the commodity has been taken. DD is the demand curve, which shows that there is an inverse relationship between price and demand. When the price of the commodity is OP, quantity

demanded of the commodity is OQ. Now, as the price increased to OP1, quantity demanded has reduced to OQ1.

1.11.2 Why Does Demand Curve Slope Downward

The law of demand shows an inverse relationship between price and demand of a commodity. It means when own price of the good decreases its quantity demand will increase and when it increases its demand will decrease. Following are the reasons for this:

A. **Law of Diminishing Marginal Utility:** Every commodity which is demanded by the consumer has utility. As the consumer consumes additional units of it, in a given time, the utility derived from each successive unit diminishes. We can say that the law of diminishing marginal utility applicable to his consumption. This Law states that marginal utility of any good diminishes as more and more of that commodity is purchased by the consumer. Therefore, a consumer will purchase more of a commodity when he has to pay fewer prices for it. According to the law of diminishing marginal utility, the consumer will stop his purchase at that point where the marginal utility of the commodity is equal to the price paid for it.

B. **Income Effect:** When the price of a commodity declines, the people who have used this commodity before will demand more units of that commodity because the price has fallen. With the fall in the price of a commodity there is an increase in the consumer's real income therefore, the consumer will demand more of that commodity. Real income is called the purchasing power of money income. In other words, money's purchasing power has increased, which allows consumers to purchase more of the same commodity for the same amount of money they previously spent.

C. **Substitution Effect:** When the price of a commodity decreases, it means that it has become less expensive in comparison to other commodities. In comparison to alternatives whose prices have not dropped, this decrease in price makes it more appealing. As a result, people substitute it for other things. For instance, tea and coffee are substitutes for each other. If the price of tea increased, the consumers may substitute coffee for tea, although the price of coffee remains the same. Thus, demand for tea declined as it is becoming more expensive because of a rise in its price. On the other hand, if the price of tea decreases, the consumer will substitute tea for coffee as it is becoming less expensive. Therefore, the demand for tea increased.

   The substitution effect is the stronger out of the two effects because the buyer will often

substitute the cheaper for the more expensive commodity. Furthermore, although the substitution effect is always positive, the income effect may be positive in some cases and negative in others. For example, the income effect is negative when the commodity is inferior. However, since a consumer spends only a small percentage of his income on a single commodity, the income effect is usually negligible, whereas the substitution effect is always so strong that the net result is positive.

1.11.3 Exceptions to the Law of Demand

It is generally believed that the law of demand is valid in most circumstances. The law of demand does, however, have several exceptions. It means that the market for certain goods grows when the price rises and contracts when the price falls. In the case of such goods, the demand curve slopes upwards from left to right.

1) When people expect that the price of a good will increase in the future, they will buy more of it, even at a higher price, in order to avoid a future price increase. This type of situation can be seen during wartime, particularly in case of basic necessities.

2) The Veblen Effect is a term used to describe a phenomenon that occurs with the name of the economist Thorstein Veblen, who proposed the theory of conspicuous consumption, is synonymous with one exception to the law of demand. According to Veblen, some consumers determine the utility of a commodity solely based on its price, i.e., the higher the price, the higher the utility. For example, the market demands for goods like diamond and jewellery, which are symbols of social status and confer a distinction on the holder, do not follow this rule. Since such goods are in high demand due to their high price, demand for them rises as their price rises.

3) Giffen goods (named after Sir Robert Giffen, a nineteenth-century economist) are inferior goods whose demand falls even though their price falls, defying the law of demand. For instance, poorer sections of society cannot afford to buy superior varieties of foodgrains such as wheat and they are forced to purchase the inferior varieties like maize. Therefore, when the price of maize falls, their real income rises. As a result, they don't buy as much maize as the law of demand will require. Rather, they will continue to demand superior varieties, such as wheat, to replace maize.

4) When something goes out of fashion, demand for it does not increase, even though the price decreases. In the opposite case, as a product's popularity grows, people will buy more of it, even though its price rises. The rule of demand is broken in each of these situations.

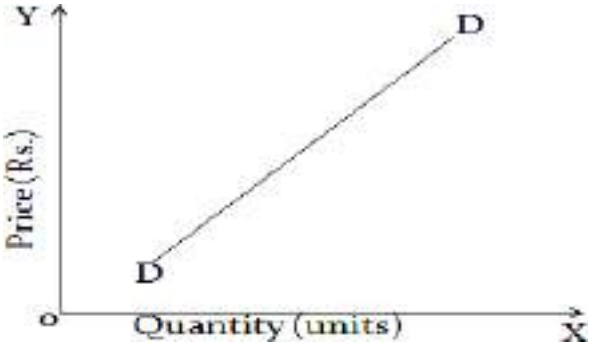


Figure 4

However, these exceptions do not invalidate the law of demand, which applies to the number of goods sold in the market. Though certain individuals do not behave by this law in some circumstances, it is noteworthy here that the law of demand operates in general.

1.12 Factors Determining Demand

Although stating the law of demand, we now come to the 'other things' that are assumed to remain constant. As a result, only price doesn't need to bring change in demand for a commodity. Changes in other factors, as discussed below, may have the same effect:

1) **Price of a Commodity:** The price of the commodity is the most important factor influencing the quantity demanded of that commodity. Normally, a price rise is followed by a decrease in demand and a price decrease is followed by an increase in demand. The law of demand describes the functional relationship between price and demand.

2) **Change in Income:** This shift has a significant impact on demand because when a consumer's income rises, so does his willingness to pay and he can buy more goods than before. Changes in the distribution of income in favour of the poorer sections of society increase their purchasing power, and their demand for commodities in general, and necessities of life in particular, is bound to rise as a result.

3) **Change in Tastes and Fashion:** Demand is also affected by changes in tastes and fashions. The growing popularity of cotton clothing has decreased demand for synthetics. Tea's popularity has dwindled as coffee has grown in popularity.

4) **Change in Size and Composition of Population:** Increases in a country's population have a significant impact on demand because the greater the amount of mouths to feed, the greater the quantity of a commodity required. Not only the size of demand but also the composition of demand, is influenced by the population's age structure.

5) **Prices of Substitutes:** A commodity's demand is often influenced by the availability and

price of substitutes. People would use a substitute for a good that is available at a lower price if the price of the former rises. This would decrease demand for the former commodity while increasing demand for the substitute. For instance, people will start drinking coffee if the price of tea increases the demand for coffee. A decrease in the price of tea, on the other hand, may reduce coffee demand.

6) **Technical Progress:** Technical advancement allows for the production of a wider range of products, which reduces the demand for out-of-date products. The invention of television, for example, lowered the demand for radios.

7) **Expectation about Future Prices:** If there is a general feeling among people that prices in future will go up, there will be a greater demand for goods and everyone will buy more than his normal requirement. If prices in future are expected to go down, people will try to postpone their purchases and wait for the fall in prices. This will reduce the present demand for goods to a considerable extent.

8) **Change in Season:** The demand for some goods can fluctuate as the season changes. In the winter, for example, demand for woolen clothes increases. Similarly, during the summer, cold beverages are in high demand.

Check Your Progress -II

Q.1 Why the demand curve is downward sloping?

Ans:_____

_____

Q.2 What are the factors which are determining the demand for a commodity?

Ans:_____

_____

1.13 Movement along a Demand Curve and Shifts in Demand Curve

Movement along a Demand Curve Extension and contraction in demand of a commodity is caused by change in its own price

(i) Extension of Demand: The term "extension of demand" refers to an increase in quantity demanded as a result of a decrease in the commodity's own price when all other factors remain constant. Extension in demand can be explained with the help of a figure no 5. It is evident from the figure that when price is OP_1 demand is OQ_1. Now a decline in price from OP_1 to OP will lead to an increase in quantity demanded from OQ_1 to OQ. This is

called extension in demand.

(ii) Contraction of Demand: Contraction of demand refers to a decrease in quantity demanded as a result of an increase in the commodity's own price when all other factors remain constant. In figure 5when price is OP, quantity demanded of the commodity is OQ. Now there is an increase in price from OP to OP1, as a result, quantity demanded of the commodity will decrease from OQ to OQ1. This is known as contraction in demand.

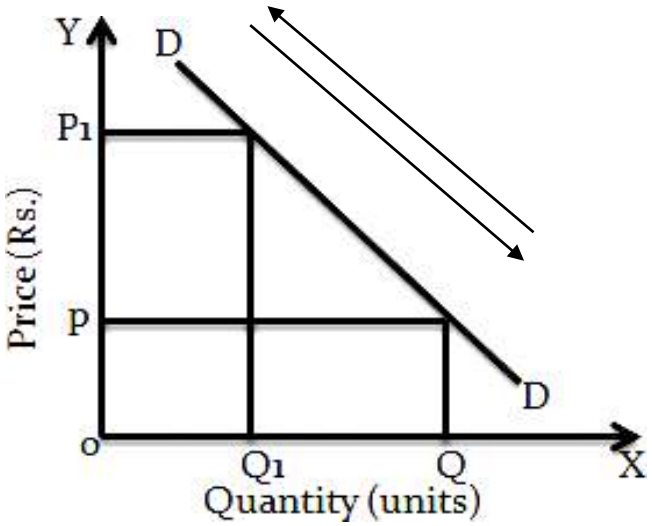


Figure 5

As we studied that demand of a commodity depends upon its price and some other factors like prices of related commodities, consumer's income and their tastes and preferences etc. When demand increases due to fall in price or decreases due to rise in price, this is called extension and contraction of demand respectively. There is a shift in the entire demand curve as demand changes due to factors other than price.

B. Shifts in Demand Curve

(i) Increase in Demand: The demand for a commodity is influenced by the consumers' incomes, as well as their tastes and preferences for the commodity. As a result, any change in these variables would result in a shift in the demand curve. For illustration, if consumers' incomes rise as a result of increase in wages and salaries, they would demand more of a good at each price. A rise in demand means that more of a good is being demanded at the same price, or the same quantity of the good is being demanded at a higher price. We are now on a new demand curve that is to the right of the old demand curve.

Causes of Increase in Demand

The following are the reasons for the same:

a. When the income of the consumer increases.

b. When the price of substitute goods rises.

c. When the price of the complementary goods decreases.

d. When tastes and preferences of the consumers shift in favor of the commodity.

e. Expectation of rise in price in future.

f. Increase in population.

(ii) Decrease in Demand: If the factors influencing demand change negatively, demand will fall, causing a shift in the demand curve to the left. For instance, if consumers' income declines as a result of an increase in taxes, they would demand less of a commodity. A reduction in demand means that less units of a good are demanded at the same price, while more units are demanded at a lower price. We're on a new demand curve that's to the left of the old demand curve.

Causes of Decrease in Demand

Due to the following reasons the demand decreases or demand curve shifts backward

a. When the income of the consumer declines.

b. When the price of the substitute goods decreases.

c. When the price of complementary goods rises.

d. When tastes and preferences of the consumers shift against the commodity. It may be due to changes in fashion or changes in climate.

e. Expectation of fall in price in the near future.

f. Decrease in population.

An increase in demand and a decrease in demand can be shown with the help of a figure. It will be seen from the figure 6 that at price OP, OQ quantity of a good is demanded. Curve D_1D_1 indicates an increase in demand because at the same price quantity demanded has increased from OQ to OQ_1. Curve D_2D_2 indicates a decrease in demand because at the same price quantity demanded of the commodity has decreased from OQ to OQ_2.

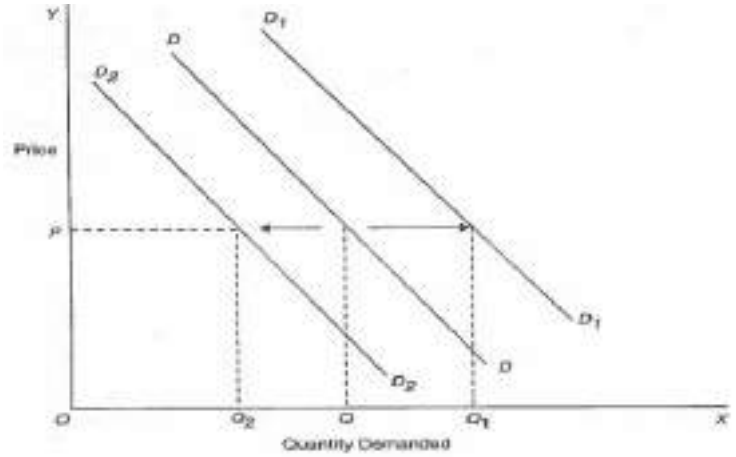


Figure 6

Check Your Progress-III

Q.1 What are economic models? Why do economists build economic models?

Ans:_____

_____

Q2. Write a note on the importance of assumptions in economic analysis.

Ans:_____

_____

1.14 Summary

In this unit, we have learned that economic theory is concerned with the laws and principles that regulate the operation of an economy and its numerous components. The existence of an economy is based on two fundamental facts. To begin with, human desires for goods and services are unlimited, and productive resources to produce those desires are limited. Therefore, an economist must decide how to best allocate a few resources in order to maximise the satisfaction of the members of society. There are two major branches of economics that are micro economics and macro economics. Micro economics deals with an individual unit of the economy, whereas macro economics deals with the economy as a whole. It considers two aspects i.e., positive science and normative science. Positive science is a systematic knowledge relating to criteria of what it is and normative science is a systematised knowledge relating to criteria of what ought to be. Economics also considers two methods of methodology, i.e. inductive and deductive. Inductive method is a system of reasoning from general conclusions to specific results and deductive method is a way of reasoning from specific facts to general

conclusions.

1.15 Questions for Practice

A. Short Answer Type Questions

Q1. What do you mean by economics?

Q2. Discuss the problems of allocation of resources.

Q3. Discuss the problems of choice of techniques.

Q4. Discuss the nature and scope of economics.

Q5. Distinguish between positive and normative economics.

Q6. Explain deductive methods.

Q7. Write a note on inductive methods.

Q8. Explain the role of assumptions in economic theory

Q9. What do you mean by demand in economics?

Q10. What are the main determinants of demand for a commodity?

Q11 With the help of a diagram explains the concepts of individual demand curve and market demand curve.

Q12. What do you understand by law of demand?

Q13 Why does demand curve slope downward?

Q14. Mention the exceptions to the law of demand.

Q15. Distinguish between extension of demand and contraction of demand.

Q16. Distinguish between increase in demand and decrease in demand.

B. Long Answer Type Questions

Q1. Define economics. Explain in detail the nature and scope of economics.

Q2. Discuss the five fundamental problems of any economy.

Q3. QExplain inductive and deductive methods in economics. Also mention their merits and demerits.

Q4. What is meant by demand? Mention the factors which influence the demand for a commodity.

Q5. Distinguish between a demand curve and demand function. What are the factors that cause a shift in the demand curve?

Q6. Explain the law of demand. Why does the demand curve slope downwards to the right?

Q7. Explain the difference between

a. Extension of demand and contraction of demand

b. Increase in demand and decrease demand.

Q8. Critically evaluate the law of demand.

Q9. Explain 'Veblen Effect' and Giffen Paradox. Does the usual law of demand apply in their case?

1.16 Suggested Readings

- H. L. Ahuja, Principles of Microeconomics, S. Chand & Company Ltd. New Delhi
- D.N. Diwedi, Microeconomics, Theory and Application, Vikas Publishing House, New Delhi.
- Gregory, N. M, Principles of Microeconomics, second edition.
- Perloff, J. M, Microeconomics, Theory and Application with Calculus, Pearson Addison Wesley.
- Koutsoyiannis, A, Modern Microeconomics, The Macmillan Press Ltd.

BACHELOR OF ARTS

SEMESTER –I

COURSE: MICRO ECONOMICS

UNIT 2: ELASTICITY OF DEMAND

STRUCTURE

2.0 Learning Objectives

After completion of this, the learner will be able to:

- Discuss the concepts of elasticity of demand
- Degrees of elasticity of demand
- Explain the measurements of price elasticity of demand

2.1 Introduction

In the preceding pages, we have studied that when the price of a good falls, the quantity demanded rises and when the price rises, the quantity demanded decreases. This is referred to

as the law of demand. Only the direction of change in quantity demanded of a product in response to a change in its price is indicated by this law of demand. Therefore, this law does not tell us by how much or to what extent the quantity demanded of a good will change in response to a change in its price. This information as to how much or to what extent the quantity demanded of a good will change as a result of a change in its price is provided by the concept of price elasticity of demand.

2.2 Elasticity of Demand: Meaning

J.S. Mill and Cournot were the early economists who referred to the elasticity of demand in economics. But this concept was developed by Dr. Marshall in his famous book "Principles of Economics". Elasticity of demand refers to the degree of responsiveness of quantity demanded of a commodity to a change in its price. There are three concepts of elasticity of demand: price elasticity, cross elasticity and income elasticity. The degree of responsiveness of the quantity demanded of a commodity to a change in its price is referred to as price elasticity of demand. The degree of responsiveness of a good's demand to a shift in the price of a related good, which may be a replacement or complementary to it, is referred to as cross elasticity of demand. The sensitivity of quantity demanded of a commodity to a shift in consumers' income is referred to as income elasticity of demand.

2.3 Types of Elasticity of Demand

There are three concepts of elasticity i.e., income elasticity, cross elasticity and price elasticity.

1. Income Elasticity of Demand

When all other factors remain constant, such as the price of the given commodity, the prices of related goods and the consumer's taste etc. the percentage change in the quantity demanded of a thing caused by a given percentage change in the consumer's income is referred to as income elasticity of demand. According to Watson, "Income elasticity of demand means the ratio of the percentage change in the quantity demanded to the percentage change in income."

Income elasticity can be measured by the following formula:

$$Ey = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in income}}$$

Income elasticity varies by the nature of commodities. The income elasticity is positive for all normal goods, because with increase in income of the consumer, his demand for normal goods will increase. On the other hand, income elasticity is negative for inferior goods or Giffen

goods. In the case of inferior goods, when income of the consumer will increase then quantity demanded of these goods will decline and when income of the consumer will decrease then quantity demanded of these goods will increase.

Importance of Income Elasticity of Demand

A. Helpful in Business Decision Making: It is useful for both business firms and industries in making decisions. If a company's product has high income elasticity, it has a lot of potential to develop in a growing economy. It is worth noting that the market for luxuries is extremely income elastic. As a result, demand for luxuries fluctuates greatly in different phases of business cycles. Therefore, demand for luxuries increases more during boom periods and declines sharply during recessionary periods.

B. Helpful in Designing Marketing Strategies of a Firm: It is also useful in designing marketing strategies of the firms. We learned in demand concepts that a person's income is a significant determinant of a product's demand; as a result, firms that produce goods with high income elasticity of demand try to locate their sales outlets in cities or regions where people's income is rapidly growing.

C. Helpful to Understand the Plight of Farmers: This concept is very useful to demonstrate why farmers' income will not increase in the same way as the income of urban people who are working in manufacturing industries. The major cause behind this is that the income elasticity of demand for agricultural products such as food grains is less than one; as a result, it is very difficult that farmers' income from agriculture will increase in proportion to the growing national income.

2. Cross Elasticity of Demand

Changes in price and quantity demanded of two related goods have a mutual relationship. Therefore, when the price of one good change the demand for the related good will also change. For instance, tea and coffee are two related goods. Thus, when the price of tea changes the demand for coffee will also change.

In simple words, cross elasticity of demand is a measure of change in quantity demanded of good-Y, as a result of change in the price of good-X. According to Ferguson, "The cross elasticity of demand is the proportional change in the quantity of good-X demanded resulting from a given relative change in the price of the related good-Y."

It can be measured as:

$$= \frac{\text{Percentage change in quantity demanded of good}-X}{\text{Percentage change in the price of good}-Y}$$

It is important to note here that when two goods are substitutes for each other, cross-elasticity of demand among them is positive like tea and coffee. Because increase in the price of tea, increases the demand for coffee. However, the cross-elasticity of demand for complementary goods like bread and butter is negative, because increase in the price of one decreases the demand of another.

Importance of Cross Elasticity of Demand

A. For Formulating Price Strategy: This concept is crucial in managerial decision-making when it comes to developing a proper pricing strategy. Multiproduct firms often use this method to measure the impact of a change in one product's price on demand for other products.

B. For Defining the Boundaries of an Industry: It can also be used to define an industry's boundaries and measure interrelationships between industries. It is worth noting that, due to the interdependence of firms and industries between which cross price-elasticity of demand is positive and strong; no one can increase the price of their product without losing sales to other firms in similar industries.

3. Price Elasticity of Demand

Price elasticity of demand indicates the degree of responsiveness of quantity demanded of a commodity to the change in its price, other factors such as consumers' income, prices of related commodities that determine demand are held constant. It is defined as the ratio of the percentage change in quantity demanded of a commodity to a given percentage change in price. It is expressed by minus (-) sign like:

$$e_d = (-)\frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}}$$

For example, 5 per cent fall in price of a commodity will lead to 10 per cent increase in demand then elasticity of demand will be

ed = (-)10% = (-) - 2 = 2, i.e, = −5%

It is important to mention here that fall in price is indicated by minus (-) sign and due to multiplication, the negative signs turned to be positive.

According to Prof. Marshall, "Elasticity of demand may be defined as the percentage change in the quantity demanded divided by the percentage change in the price." According toA.L. Meyers, "The elasticity of demand is a measure of the relative change in amount purchased in response to a relative change in price.

2.4 Degrees of Price Elasticity of Demand

When it comes to the change in quantity demanded as a result of change in price, goods differ. In certain cases, this response is insignificant, while in others, it is considerable. As a result, demand elasticity ranges from 0 to infinity. However, the five most well-known categories are mentioned below.

1. Perfectly Elastic Demand Curve: The demand for a commodity is said to be perfectly elastic, if at the same price, buyers can purchase as much as they can, while at a slightly higher price, they will buy none at all. It means demand is infinite at the prevailing price. The demand curve in this case is parallel to the X-axis as shown in figure.7

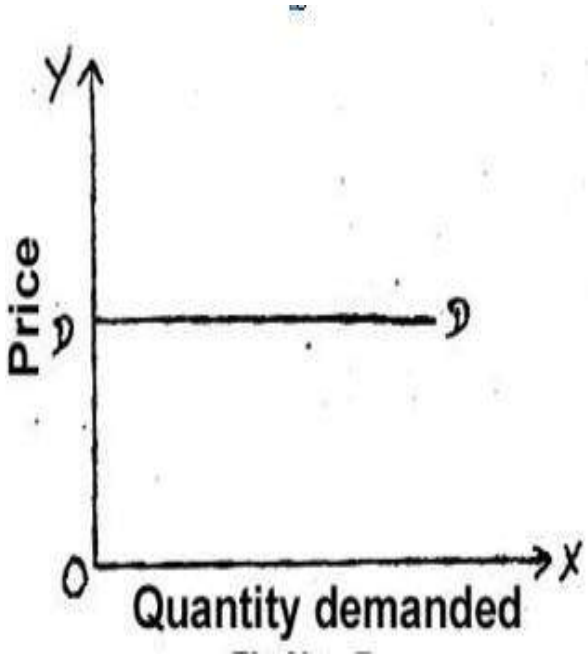


Figure 7

2. Perfectly Inelastic Demand: The quantity demanded is said to be perfectly inelastic when a significant increase or decrease in price is not accompanied by any change in the quantity demanded. The demand for insulin by the diabetic patient is the perfect example of perfectly inelastic demand. As shown in fig. no. 8, the demand curve in this case is a vertical straight line parallel to the Y-axis. Elasticity of demand in this case is zero.

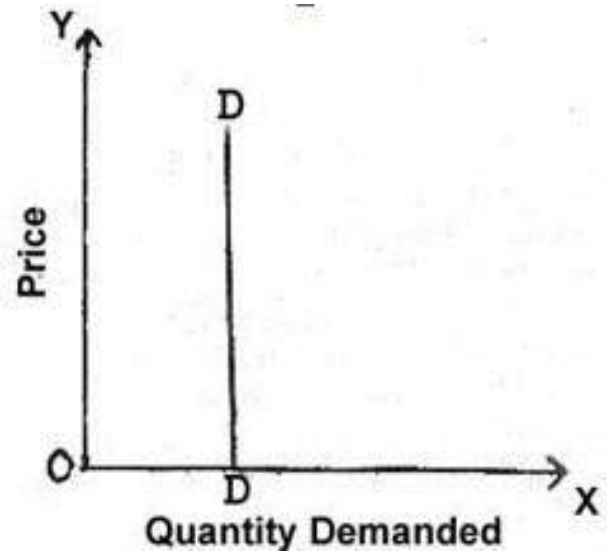


Figure 8

3. Unitary Elastic Demand: The elasticity of demand is said to be equal to unity when the percentage change in quantity demanded equals the percentage change in price. The elasticity of demand is equal to unity if the price of a good doubles and the quantitydemanded is reduced to half of what it was previously demanded. Elasticity of demand in this case is one. This is depicted in figure 9.

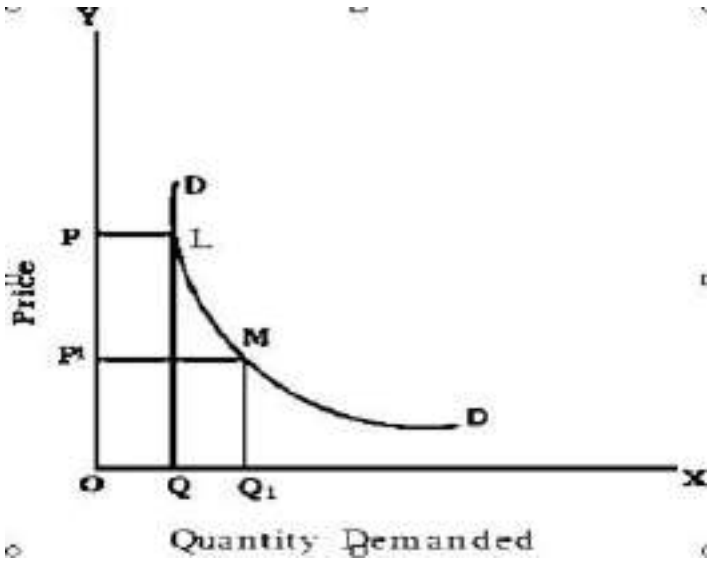


Figure 9

4. Greater than Unitary Elastic Demand: The elasticity of demand is greater than one when the percentage change in quantity demanded is greater than the percentage change in price. It is important to note that when change in quantity demanded is more in response to change in own price of the commodity then total expenditure on the commodity increases and vice-versa. For example, in the case of color televisions and air conditioners a significant increase in demand

has been seen in response to a modest price reduction. This is depicted in figure 10.

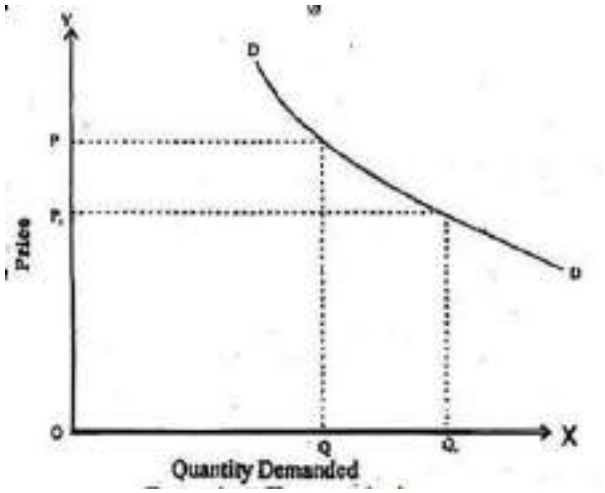


Figure 10

5. Less than Unitary Elastic Demand: The elasticity of demand is less than unity when the percentage change in quantity demanded is less than the percentage change in price. This case is prevalent in the majority of necessities of life, such as salt, wheat, rice and sugar. In this case total expenditure on the commodity decreases when price falls and increases when price increases. This is depicted in figure 11.

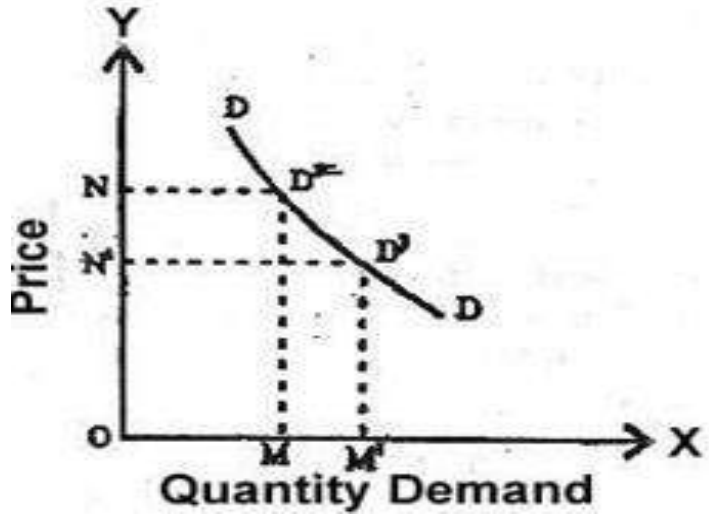


Figure 11

Check Your Progress -III

Q.1 Explain in detail the increase in demand and decrease in demand.

Ans:_____

_____

Q.2 What is meant by price elasticity of demand? What are different degrees of elasticity of

demand?

Ans:_____

_____

2.5 Measurement of Price Elasticity of Demand

Elasticity of demand can be measured in various ways. The following commonly used methods are:

- **Total Outlay or Total Expenditure Method**
- **Percentage Method**
- **Point Method**
- **Arc Elasticity Method**

1. Total Outlay or Total Expenditure Method

Marshall first mentioned this method in his book "Principles of Economics." According to Marshall, if a decrease in price results in an increase in total outlay and an increase in price results in a decrease in total outlay the elasticity of demand is more than unity. On the other hand, due to fall or rise in price, if the total outlay remains constant then the elasticity of demand is equal to unity. Apart from that, if a rise in price results in increased outlay and a fall in price results in decreased outlay, the elasticity of demand is less than unity. Note that, under this method we measure elasticity of demand by examining the change in total outlay due to change in price.

The relationship between price elasticity and total expenditure can also be explained with the help of the following table.

Table 3 Relationship between Price Elasticity and Total Expenditure

Price Change	Elasticity greater than one ($E_d > 1$)	Elasticity less than one ($E_d < 1$)	Elasticity equal toone ($E_d = 1$)
Price falls	TE increases	TE decreases	No change in TE
Price rises	TE decreases	TE increases	No change in TE

We can understand the above mentioned relationship with the help of the following figure. Consider Figure. 13. In this, total outlay is shown on X-axis and price on Y-axis. At OP price, the total outlay is PM, when price falls from OP to OP1 the total outlay increases from PM to

P1M1, and elasticity of demand is more than unity. When the price decreases from OP1 and OP2 total outlay is P2M2 which is the same as P1M1. Therefore, elasticity of demand is equal to unity. Similarly, when the price of a commodity decreases from OP2 to OP3 total outlay decreases from P2M2 to P3M3. In this case, the elasticity of demand is less than unity.

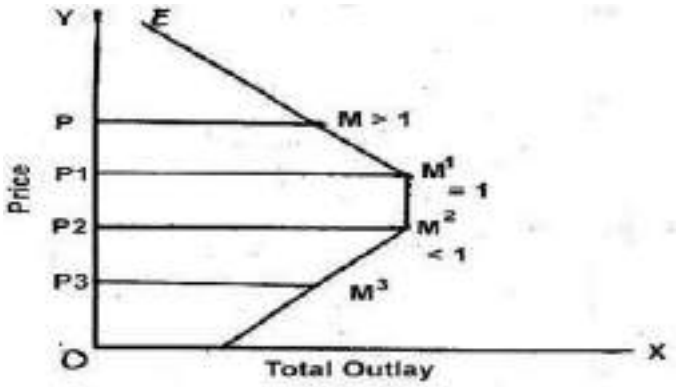


Figure 13

2. Percentage Method

This is the second method for calculating elasticity. According to this method elasticity of demand is calculated as the proportional change in quantity demanded divided by the proportional change in price. According to Prof. Marshall, if a given percentage fall or rise in price results in an equal percentage rise or fall in the quantity demanded, the elasticity of demand is equal to unity or in other words, if 5% falls or rise in price results to 5 % rise or fall in the quantity demanded, elasticity of demand is equal to unity. As a result, elasticity is defined as the proportion of a change in quantity demanded to a change in price paid.

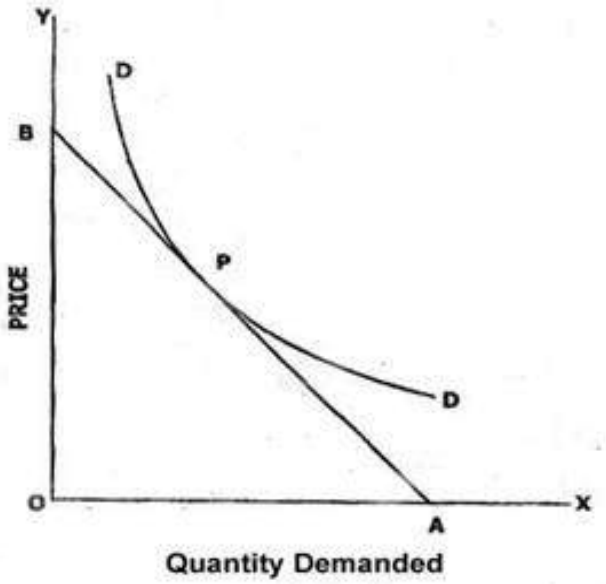
$$e_d = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}}$$

3.Point Method

We are occasionally interested in measuring elasticity of demand at a particular point since the degree of elasticity of demand can vary on different parts of a demand curve in Figure 14.

Figure 14 illustrates how to calculate the elasticity of demand at a particular point on a demand

curve. If P is any point on a demand curve DD. At P, a tangent is drawn to this curve, which



touches the X-axis at A and Y-axis at B. The ratio PA/PB represents the elasticity of demand at P. Because PA is longer than PB, the demand elasticity at P is greater than one. The following formula is used to calculate demand elasticity at a given point:

$$e_d = \frac{\text{Lower Segment}}{\text{Upper Segment}}$$

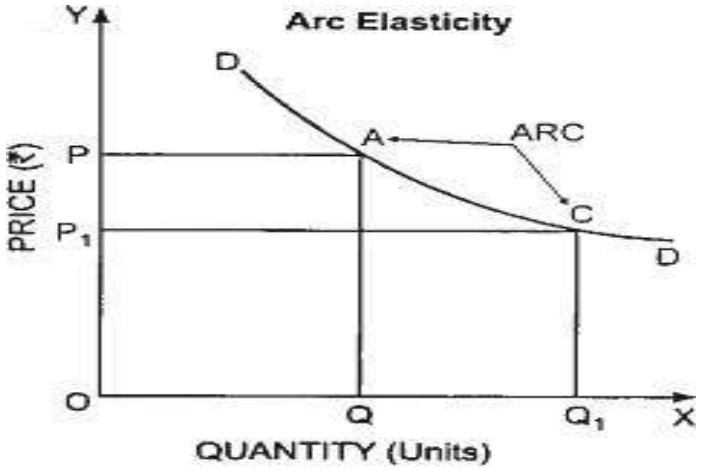
Lower Segment Upper Segment

It is worth mentioning here that if there is an infinitely small change in price and quantity demanded, the percentage method to calculate demand elasticity at a given point on the demand curve can be used; however, if the changes are considerable, this formula will be of little use.

4. Arc Elasticity Method

When using the percentage method to determine price elasticity of demand, we must decide whether to use the initial price as the base for calculating percent change in price or the initial quantity as the base for calculating percent change in quantity demanded in response to a given percent change in price. To avoid this difficulty, we calculate the percentage change in price or quantity demanded using the arc elasticity approach, which uses the midpoint of the initial and final price and quantity demanded respectively as the base. Thus, arc elasticity is the measurement of elasticity between two points on a demand curve. According to Watson, "Arc elasticity is the elasticity at the mid-point of an arc of a demand curve."

The portion of the demand curve DD shown in figure 15 between two points A and C is known



as Arc. It will be seen from the figure that when price is OP, quantity demanded is OQ. When price falls to OP1, quantity demanded will be OQ1.

It should be emphasized that this method of measuring price elasticity of demand must be used for large price changes.

2.6 Factors Affecting Elasticity of Demand

We have studied from the above discussion that elasticity of demand is different for different goods. This is due to the following factors:

1. In general, demand for necessities of life (such as food, clothing, salt, kerosene and oil etc.) are inelastic, whereas demand for luxury products is elastic. This is due to the fact that the consumption of a certain minimum of these necessities is required for human survival. No one can live without these items, no matter how expensive they are. However, if the price of luxuries rises over a certain level, demand for them may be reduced. A necessity does not always imply a life-or-death situation. When a person becomes habituated to consuming a certain item, it becomes an indispensable part of his consumption pattern, and his demand for it becomes inelastic. For an addict, the elasticity of demand for alcohol is less than unity.
2. Elasticity of demand is also determined by the number of alternatives uses to which a given commodity can be put. A good's demand will be elastic if it has multiple uses. Coal, for example, can be utilized in workshops, railways, factories and even in the home. If the price of coal declines, it will begin to be used in places where it was previously uneconomical to do so. It means goods which have specified use inelastic demand exists among their cases.
3. The goods in case of availability of substitutes are there, the elasticity of demand for such goods is elastic. If the price of coffee rises, for example, consumers would switch to tea, and

coffee consumption will drop significantly.

4. Percentage of a consumer's income spent on the commodity also influenced the elasticity of demand. If a consumer spends only a small amount of his income on a particular commodity, a price change will have little effect on the quantity demanded. To put it another way, demand for such things is inelastic.
5. The possibility of the postponement of the use of a particular good also influenced the elasticity of demand. The demands for commodities, in case of which consumption can be postponed, have elastic demand. On the other hand, the demand for those commodities consumption of which cannot be postponed is inelastic.
6. Elasticity of demand isalso determined by the level of price of the commodity. It is low when the price level of the commodity is low because with less price of the commodity the proportionate change in demand is insignificant.
7. Elasticity of demand is also affected by the income level of the consumer. If consumers have a high income, then they will not consider the price of the commodity. Therefore, in that case elasticity of demand is very low. On the other hand, if the income level of the consumers is low, then in that case elasticity of demand will be high.

2.7 Importance of Elasticity of Demand

The concept of elasticity of demand has a great significance in economics as discussed below:

1. The government will use this concept to frame its taxation policies. If the government wants to raise revenue from indirect taxes because these taxes can only be levied on those goods which have inelastic demand then elasticity of demand is an important tool.
2. Elasticity of demand is really helpful to guide the producer in different market structures. Under imperfect competition and monopolistic competition this concept guides producers while fixing prices of their products. When demand for a commodity is inelastic, a monopolist will set a high price because he is almost certain that his product will sell out. It is important to mention here that a monopolist while using price discrimination first look at the elasticity of demand for his product in different markets.
3. This is also useful to determine the extent to which a particular factor of production can get its remuneration raised. For instance, if in an industry demand for a particular type of labour is inelastic, then they can receive higher wages as compared to wages paid to other categories.

4. For the determination of terms of trade between two countries this concept is also very useful. Terms of trade will in favor of those countries whose demand for the product is comparatively more elastic.

Check Your Progress -IV

Q.1 How price elasticity of demand is measured?

Ans:_____

_____

Q.2 What are the determinants of price elasticity of demand

Ans:_____

_____

2.8 Summary

In this unit, we discussed consumer behaviour towards a prevailing price of the commodity. It includes the individual consumer demand (which study the behaviour of individual person) as well as the market demand (which study the behaviour of two or more persons) and factors that are affecting the demand of a product. The law of demand states that there is an inverse relationship between price and quantity demanded, all other things being equal. Other things that are assumed to be constant are the income of the consumer, tastes and preferences of the consumer and the prices of related goods etc. These aspects are considered important to determine the size of the market. Besides this, we have also studied another important aspect from a pricing-decision point of view i.e., how markets react to change in price of a product. That is called elasticity of demand. Three types of elasticity of demand have been discussed in this context i.e., price elasticity of demand, income elasticity of demand and cross elasticity of demand. Under this, the different concepts of elasticity and its degrees which includes perfectly elastic, perfectly inelastic, unitary elastic, greater than unitary elastic and less than unitary elastic. Measurement of elasticity of demand with various ways like total expenditure method, percentage method, point method and arc method.

2.9 Questions for Practice

A. Short Answer Type Questions

Q9. What do you mean by elasticity of demand?

Q10. Discuss the factors which affects the elasticity of demand. Q11. What do you mean by cross elasticity of demand?

Q12. What is arc elasticity of demand?

Q13. Discuss the concept of income elasticity of demand.

B. Long Answer Type Questions

Q7. Explain elasticity of demand. Mention the various factors which are affecting the elasticity of demand.

Q8. What is price elasticity of demand? Explain its degrees and measurements.

Q9. What is the price elasticity of demand? Explain the arc and point method of measuring the elasticity of demand.

Q10. Write a note on the following:

a. Price elasticity of demand

b. Income elasticity of demand

c. Cross elasticity of demand

2.10 Suggested Reading

- H. L. Ahuja, Principles of Microeconomics, S. Chand & Company Ltd. New Delhi
- D.N. Diwedi, Microeconomics, Theory and Application, Vikas Publishing House, New Delhi.
- Perloff, J. M, Microeconomics, Theory and Application with Calculus, Pearson Addison Wesley.
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BACHELOR OF ARTS

SEMESTER –I

COURSE: MICRO ECONOMICS

UNIT 3: CONSUMER BEHAVIOUR: UTILITY ANALYSIS

STRUCTURE

3.0 Learning Objectives

At the end of this unit, learner will be able to:

- Develop relation between total utility and marginal utility
- Differentiate between ordinal and cardinal utility analysis
- Determine the consumer's equilibrium with single commodity and two commodities under

cardinal utility analysis

- Criticism of the analysis

3.1 Introduction

The theory of consumer behaviour examines the relationship between quantity demanded of a commodity and its price by highlighting the reasons for the establishment of the relationship. A number of theories have been put forward by various economists to analyse consumer's demand for a commodity.

3.2 Cardinal Utility Analysis

The cardinal utility analysis for explaining the concept of consumer behaviour has been favoured by classical economists namely Adam Smith, Gossen, Walras, Dupuit, Jevons, J.S. Mill as well as neo-classical economists i.e. Marshall and Pigou. According to this analysis, consumer purchases a certain good because of its utility. Utility can be measured in cardinal numbers i.e. 1, 2, 3, etc. Fisher has put forward the term 'Util' as a unit to measure utility. Basically, utility is that quality in a good with which our wants are fulfilled. According to Mrs. Joan Robinson, "Utility is the quality in commodities that makes individuals want to buy them." Utility is different from satisfaction. Utility is that quality of a good which fulfils the wants and satisfaction we get after the fulfilment of our wants.

There are various features of utility.

1. Utility is subjective in nature as it deals with the mental satisfaction of a consumer. Different persons derive different utility from a same commodity.
2. Utility is relative as it never remains the same and varies with time and place.
3. It is not necessary that utility is always useful. Sometimes, a good having utility is not useful e.g., drugs are harmful for the health of human beings but these have utility for an addict for fulfilling his want.
4. There is no relationship between utility and morality. Both are independent of each other. Use of cigarette is not good from moral point of view but it has utility for smoker as it fulfils his want.

There are three concepts of utility i.e., initial utility, total utility and marginal utility. Initial utility is the utility derived from the consumption of first unit of a good which is always positive. Total utility is the summation of the utilities derived from the consumption of various

units of a good.

TUX = f(QX)

where TUX = Total utility from good X and QX = Units of good X.

Table 1: Relation between Marginal Utility and Total Utility

Table 1: Relation between Marginal Utility and Total Utility		
Units of Apples	Total Utility (in utils)	Marginal Utility (Utils)
1	12	12
2	20	8
3	24	4
4	24	0
5	20	-4

Marginal utility is the addition made to total utility by consuming one more unit of a commodity. The marginal utility can be measured as follows:

$$MU_n = TU_n - TU_{n-1}$$

where MU_n= Marginalutility of n^{th} unit,TU_n= Total utility of n unitsand TU_{n-1}= Total utility of (n-1) units. If the total utility from 10 mangoes is 200 and from 9 mangoes is 192, then the marginal utility of the 10^{th} mango is

$$MU_n = TU_n - TU_{n-1} = 200 - 192 = 8$$

Marginal utility is the rate of change of total utility due to a unit change in the quantity of a particular good. It measures the slope of total utility curve at a given point. Marginal utility can also be measured as follows:

$$MU = d(TU) / dQ$$

The relationship between totalutility and marginal utility has been put forward by Jevons. Marginal utility can be positive,negative or zero. The marginal utility will be positive as total utility increases due to the consumption of additional units ofa good. The marginal utility will be zero when total utility is maximum. As total utility falls by consuming additional units of a good, then marginal utility will benegative. The table 1 shows the relation between marginal utility and total utility. As first apple is consumed total utility is 12 utils.

Total utility increases to 20, when second apple is consumed. Total utility further increases to24 by consuming third apple. As fourth apple is consumed total utiliy remains at 24 utils

but declined to 20 utils, when fifth apple is consumed. Total utility goes on increasing as more and more units of a good are consumed but upto a limit. Marginal utility is positive and declining during the consumption of three apples when total utility is increasing. Marginal utility is zero during the consumption of fourth apple when total utility is maximum. By consuming fifth apple, total utility starts declining and marginal utility becomes negative i.e- 4.

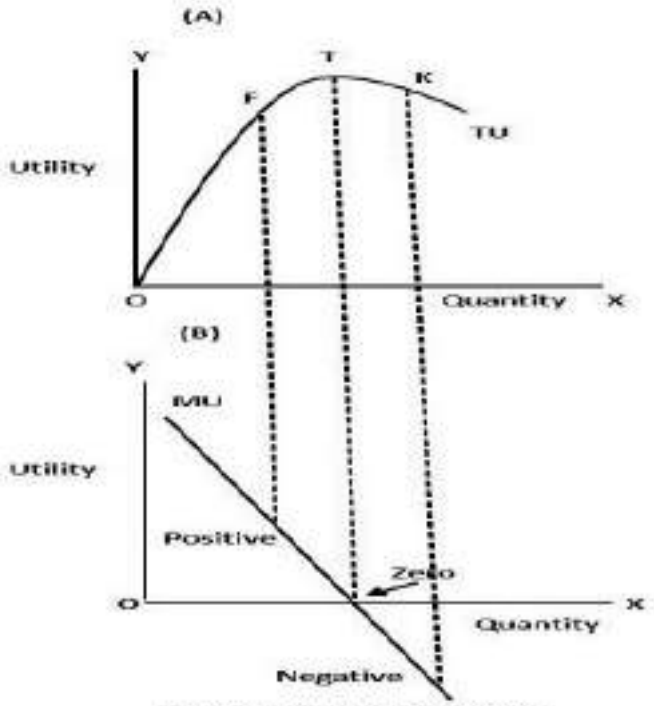


Figure 1: Relation between total utility and marginal utility

The figure marginal utility, part (A) shows total utility curve i.e. TU and part (B) shows marginal utility curve i.e. MU. In part (A)and part (B), units of good are shown on OX axis and utility on OY axis. At point F, where total utility is increasing, marginal utility is positive and declining. At point T, total utility is maximum and marginal .1 is zero. At point K, total utility is declining and marginal utility is negative.

3.2.1 Assumptions of Cardinal Utility Analysis

The cardinal utility analysis rests on some basic assumptions which are as follows:

1) The consumer is rational as he wants to maximise his satisfaction from the given income.
2) Utility can be measured in cardinal number system i.e., 1,2,3…
3) Marginal utility derived from each good is independent. Utility of a given good depends upon the quantity of that good only. The utility derived from other goods

does not affect utility of the given good.

4) The marginal utility of money remains constant.
5) The marginal utility derived from the consumption of successive units of a commodity goes on diminishing.
6) Commodities are divisible into small units.
7) Consumption of different units of a good must be during the same time period.
8) The quality and size of different units of a good must be uniform.
9) There should be no change in the fashion, mental condition of consumer and price ofthe good or its substitutes.

3.2.2 Laws of Cardinal Utility Analysis

There are two main laws of cardinal utility analysis related to consumer behaviour. These are:

a. Law of diminishing marginal utility
b. Law of equi-marginal utility

3.2.2.1 Law of Diminishing Marginal Utility

The various economists like Gossen, Bentham, Walras, Jevons, Menger and Marshall have made significant contribution in developing Law of diminishing marginal utility. This law is also called "Gossen's First Law". According to Marshall, "The additional benefit which a person derives from a given stock of a thing diminishes with every increase in the stock that he already has." According to Prof. Boulding, "*As a consumer increases the consumption of any one commodity, keeping constant the consumption of all other commodities, the marginalutility of the variable commodity must eventually decline*."

The law of diminishing marginal utility is based on the daily life experience of any consumer. The wants of human beings are unlimited but each particular want can be satisfied. The marginal utility derived from the consumption of additional units of a commodity goes on diminishing. A point comes when the consumer does not want to consume more units of a commodity as marginal utility derived from consumption of additional units of a commodity has become zero. This is the point at which consumer's want is fully satisfied. If consumer still consumes more units of a commodity, marginal utility will become negative. According to this law, we obtain less and less utility from the successive units of a commodity as we consume more and more of it. The law of diminishing marginal utility can be explained with the help of table 2.

Table 2: Law of Diminishing Marginal Utility	
Cups of Tea	Marginal Utility
1	8
2	6
3	4
4	2
5	0
6	-2

The consumption of first cup of tea gives8 utils of marginal utility followed by 6, 4and 2 utils from second, third and fourth cup of tea, respectively. When fifth cup is consumed, marginal utility is zero which shows a point at which consumer demand is satisfied. If consumer consumes sixth unit of the commodity, marginal utilitybecomes negative i.e. -2. The law of diminishing marginal utility can be explained with the help of figure 2. The quantity i.e. cups of tea is measured on X axis and utility on Y axis. KT represents downward sloping marginal utility curve. The consumption of first cup of tea provides 8 utils of marginal utility. The second cup gives 6 utils, third cup provides 4 utils and fourth cup yields 2 utils of marginal utility. Marginal utility becomes zero with the consumption of fifth cup of tea and touches X axis. As sixth cup of tea is consumed marginal utility becomes -2 and marginal utility curve goes beyond the X axis.

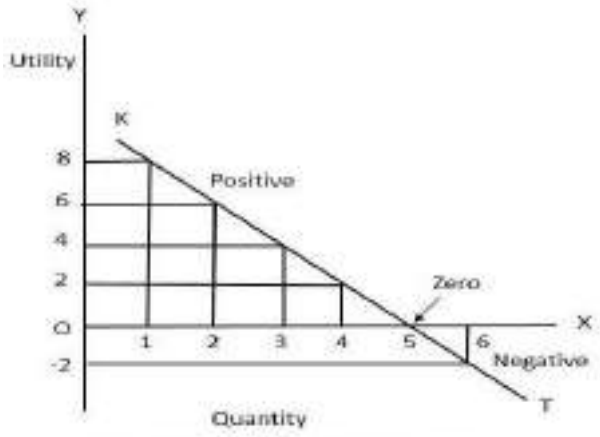


Figure 2: Diminishing Marginal Utility

There are several exceptions to the Law of Diminishing Marginal Utility. This includes rare and curious things, articles of distinction, poetry or good books, intoxicants, public goods and consumption of initial units of a commodity. The marginal utility derived from the consumption or collection of above-mentioned goods goes on increasing as their stock goes on

increasing. This law has significant theoretical as well as practical importance.

This law provides the base for the three consumption laws i.e., law of demand, law of equi-marginal utility and consumer surplus. As this law states that when marginal utility derived from additional units of a commodity becomes zero, then consumer shifts to the other commodity so the producer has to produce different varieties of good. The difference between value-in-use and value-in-exchange has been explained with the help of law of diminishing marginal utility. The goods like water, air etc. have value-in-use and command low price. As these goods are available in large quantity and used on large scale, their marginal utility declines rapidly, consequently, their price also falls. The goods like diamond,gold etc. have value-in-exchange and command high price. As these goods are scarce in nature, their marginal utility declines slowly, consequently, their price remains high. This lawhelps consumers to attain maximum satisfaction. Consumer can purchase only that much quantity of a commodity where marginal utility is equal to the price of that commodity to get maximum satisfaction. Price determination of a commodity depends upon law of diminishing marginal utility. If seller wants to sell more units of a good, he will have to decline the price of that good because more units derive less marginal utility. Hence, consumers will buy more at less prices and vice-versa.

The law of diminishing marginal utility has been criticised on several points. Cardinal measurement of utility is not possible. The various assumptions like constant marginal utility of money and no change in the fashion, mental condition of consumer and price of the good or its substitutes are not realistic. Marginal utility can only be calculated in case of divisible commodities but in reality, most of the commodities are not divisible. Marginal utility derived from each good is not independent rather marginal utility of a given good is affectedby marginal utility derived from other goods.

3.2.2.2 Law of Equi-Marginal Utility

The second law of cardinal utility analysis is the law of equi-marginal utility. This law was first propounded by Gossen. Therefore, it is also called “Gossen’s Second Law.” Different economists have given different names to this law i.e. “Law of Maximum Satisfaction”, “Law of Rational Consumer”, “Law of Substitution” and “Law of Economics”.

According to Marshall, “If a person has a thing which he can put to several uses, he will distribute it among these uses in such a way that it has same marginal utility in all.”According to Prof. Lipsey, “The household maximising utility will so allocate its expenditurebetween commodities that the last penny spent on each is equal.” According to Prof. Samuelson, “A

consumer gets maximum satisfaction when the ratio of marginal utilities of allcommodities and their price is equal."

This law states that to get maximum utility from the expenditure of his limited income, the consumer purchases such amount of each commodity that the last unit of money spent on each of them affords him the same marginal utility. According to this principal, the marginal utility of expenditure of the last unit of money spent on all of the commodities must be the same. Marginal utility of expenditure of a given commodity is the ratio of marginal utility of a commodity and its price. In case of commodity A, marginal utility of expenditure can be measured as:

$$MU_E=MU_A/P_A$$

In case of commodity B, marginal utility of expenditure can be measured as:

$$MU_E= MU_B/P_B$$

Therefore, to get maximum satisfaction, consumer equilibrium will be reached when

$$MU_E=MU_A/P_A=MU_B/P_B$$

If price of both the commodities becomes equal then the above equation can be written as:

$$MU_E=MU_A=MU_B$$

where MU_E= marginal utility of expenditure, MU_A= marginal utility of commodity A, MU_B= marginal utility of commodity B, P_A= price of commodity A and P_B= price of commodity B.

Table 3: Law of Equi-Marginal Utility

Units of Goods	**MarginalUtility of Apples (MU_A)**	**Marginal Utility of Bananas (MU_B)**	**MU_A/P_A P_A=6**	**MU_B/P_B P_B=4**
1	48	24	8	6
2	42	20	7	5
3	36	16	6	**4**
4	30	12	5	3
5	24	8	**4**	2

6	18	4	3	1

The table 3 explains the law of equi-marginal utility. The consumer has Rs. 42 to spend. It is assumed that price of commodity A is Rs. 6 and price of commodity B is Rs. 4. If consumer purchases, 5 units of commodity A and 2 units of commodity B, marginal utility of expenditure will be equal to 4.

$$MU_E=MU_A/P_A=MU_B/P_B=4$$

The law of equi-marginal utility can be explained with the help of figure 3. The part A of the figure shows marginal utility of expenditure in case of apples and part B shows, marginal utility of expenditure in case of Bananas The units of commodities and marginal utility of expenditure have been measured on X axis and Y axis, respectively. The OQ_1 units of apples and OQ_4 unitsof bananas will be purchased by the consumer where $MU_E=U_1$. Here, $MU_E=MU_A/P_A=MU_B/P_B=U_1$, so, consumer will get maximum satisfaction. If consumer purchases more quantity of apples i.e., Q_1Q_2, he will decline quantity of banana by Q_3Q_4. He will gain $Q_1Q_2K_2K_1$ amount of utility by increase the quantity of apples and will lose $Q_3Q_4T_4T_3$ amount of utility. Loss of utility is more than the gain of utility. Hence, the rearrangement of the spending of consumer will result in net loss in utility. Now, it is clear that consumer's satisfaction is maximum when marginal utility of expenditure in case of

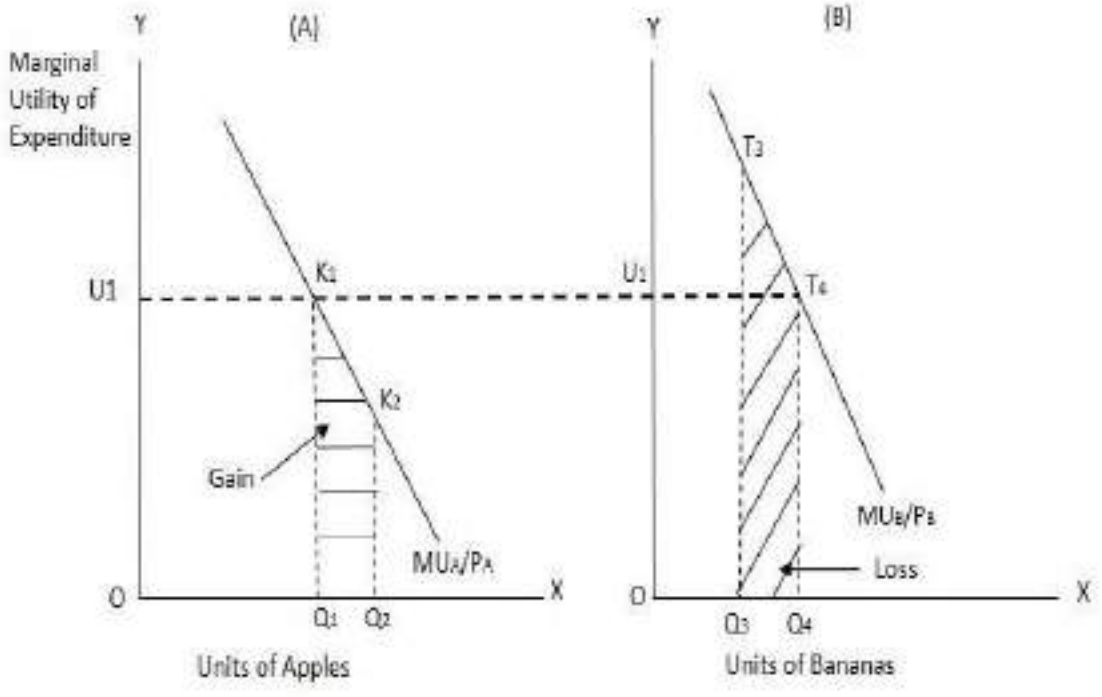


Figure 3: Law of Equi-Marginal Utility

allthe goods is equal.

The law of equi-marginal utility is very significant in the fields of consumption, production, exchange, distribution and public finance. In case of consumption, consumer will get maximum satisfaction when last unit of money spent on different commodities gives him equal marginal utility. In the field of production, producer will get maximum profit when marginal productivity of each factor is equal.

During exchange, consumer will go on substituting commodities having less utility with commodities having more utility till marginal utility of all commodities become equal.
The distribution of national income among the various factors of production should be such that each factor must get its share equal to its marginal productivity in the long run. In field ofpublic finance, taxes are levied in such a manner that marginal sacrifice of all the tax payers becomes equal.

Criticisms:

1. Cardinal measurement of utility is not possible.
2. The various assumptions like constant marginal utility of money and no change in the fashion, mental condition of consumer and price of the good or its substitutes are not realistic.
3. Marginal utility can only be calculated in case of divisible commodities but in reality, most of the commodities are not divisible.
4. Marginal utility derived from each good is not independent rather marginal utility of agiven good is affected by marginal utility derived from other goods.
5. This law assumes that consumer is rational in nature but consumers do not make suchcalculations to get maximum satisfaction in reality.
6. This law does not hold good in case of complementary goods as substitution does takeplace in case of these commodities.
7. This law is not applicable to durable goods.

3.2.3 Consumer's Equilibrium through Cardinal Utility Analysis

The consumer is said to be in equilibrium when he does not want to change his current expenditure as he is getting maximum satisfaction out of his limited income. According to Tiber Scitovosky, "A consumer is in equilibrium when he regards his actual behaviour as the best possible under the circumstances and feels no urge to change his behaviour as long as circumstances remain unchanged." Consumer's equilibrium through cardinal utility analysis can be attained under two different situations:

a. Consumer's equilibrium with single commodity
b. Consumer's equilibrium with two commodities

3.2.3.1 Consumer's Equilibrium with Single Commodity

The consumer is said to be in equilibrium if he does not want to purchase either more or less quantity of apples when whole income of the consumer is spent on single commodity i.e. apples. In case of single commodity, consumer's equilibrium will be attained at a point wheremarginal utility of commodity is equal to its price.

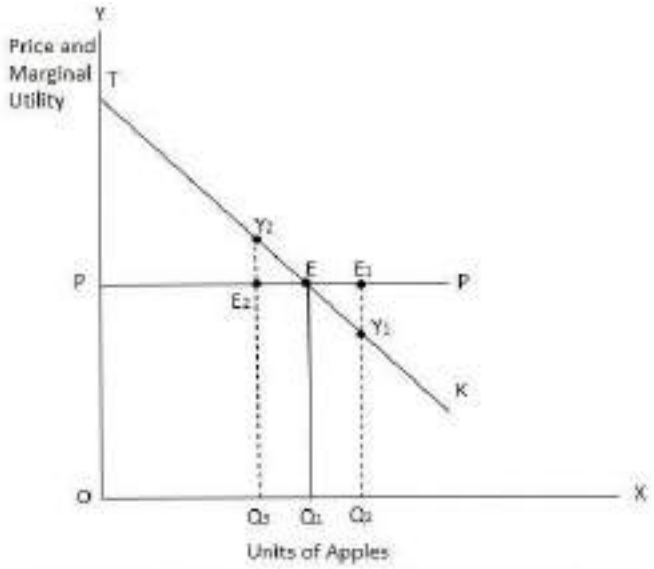


Figure 4: Consumer's Equilibrium with Single Commodity

The figure 4 explains consumer's equilibrium with single commodity in which units of applesare measured on X axis and price and marginal utility are measured on Y axis. TK is the marginal utility curve of apples. If price is OP, the consumer will purchase OQ_1 quantity of apples as at this point marginal utility of apples is equal to its price. Thus, marginal utility OQ_1ET derived from OQ_1 units of apples is maximum. If consumer purchases one more unit of apple, the marginal utility Y_1Q_2 is less than its price OP. So, he will reduce the quantity of apples to OQ_1. If consumer purchases one less unit of apple, the marginal utility Y_2Q_3 is more than its price. Therefore, consumer will increase the quantity of apples to OQ_1. Hence, consumer does not purchase either more or less quantity of apples thanOQ_1. At point E, condition for equilibrium MU=Price is fulfilled and consumer is getting maximum satisfaction here.

3.2.3.2 Consumer's Equilibrium with Two Commodities

If consumer spends his entire income on two commodities i.e. commodity A and commodity B, he will act according to law of equi-marginal utility. The consumer will go on substituting the commodity giving low marginal utility with commodity giving high marginal utility till

the marginal utilities of both the commodities become equal assuming that prices of both the commodities are same. Beyond this point, consumer does not want to make any change in hispurchases. Hence, consumer's equilibrium is attained. If prices of both the commodities are same, equilibrium condition can be written as:

$MU_A=MU_B$

Consumer's equilibrium with two commodities can be explained with the help of figure 5. Units of money spent are measured on X axis and priceand marginal utility aremeasured on Y axis. TT and KKare the marginal utility curves ofcommodity A and commodity B, respectively. Prices of boththe commodities i.e. OP_1 and $O'P_1$ are equal. At given prices, the equilibrium is attained wheremarginal utility of each commodity EM_2 is equal to its price i.e. $EM_2=OP_1=O'P_1$. At this point of equilibrium, consumer will spend OM_2 amount of money on commodity A and $O'M_2$ on commodity B. Hence, total marginal utility $OM_2ET+O'M_2EK$ derived from both the commodities is the maximum. Any further change in the consumer spending will result in decline in the total utility. Suppose consumer will spend one more unit of money on commodity B and one less unit on commodity A. If consumer incurs OM_1 units of money on commodity A, it will result in loss of utility by M_1M_2EL. If consumer spends $O'M_1$ units of money on commodity B, he will gain utility by M_1M_2EG. The loss in utility is more than the gain in utility which resultsin net loss of utility by LGE. Therefore, once equilibrium is reached, consumer does not wantto change his spending as at the point of equilibrium, he gets maximum utility.

3.3.4. Criticism of Cardinal Utility Analysis

The cardinal utility analysis has been criticised on several grounds. These are as follows:

1) The concept of utility is subjective in nature as it relates to psychology of human beings.But the consumer's demand analysis is based on the fact that utility is objective.
2) The cardinal measurement of utility is not possible i.e. 1, 2, 3 etc. It is not possible for the utility derived from different units of a commodity to be added or subtracted.
3) According to cardinal utility analysis, every commodity is independent in nature but in reality, utility of given commodity is dependent on the utility of other commodities.
4) The cardinal utility analysis is based on the concept of marginal utility but marginal utility can only be calculated in case of divisible goods. In real world, most of the commodities are non-divisible.
5) The marginal utility of money cannot be constant. If the amount of money with a person

enhances, its marginal utility declines and if the amount of money declines, its marginal utility rises.

6) The various assumptions like no change in the fashion, mental condition of consumer and price of the goods or its substitutes are not realistic.
7) The cardinal utility analysis has failed to divide price effect into substitution effect and income effect. This analysis does not explain that if demand changes with change in price, then how much demand changes with change in real income and how much with substitution of cheap commodity for the expensive commodity.
8) The cardinal utility analysis has failed to explain the Giffen Paradox. This analysis does not provide any explanation that why demand rises with increase in price and why demand decreases with decline in price, in case of giffen goods.

Check Your Progress- I

Q1. Define Law of diminishing marginal utility.

Ans_____

Q2. Explain the Law of equi-marginal utility.

Ans_____

3.4 Summary

In this lesson, the concept of consumer behaviour has been explained in respect of cardinal utility analysis as well as indifference curve analysis. In cardinal utility analysis, relation between total utility and marginal utility has been highlighted. Further, law of diminishing marginal utility and law of equi-marginal utility have been explained. In case of cardinal utility, consumer equilibrium has been analysed with single commodity as well as twocommodities. The consumer is said to be in equilibrium if he does not want to purchase eithermore or less quantity of a commodity when entire income of the consumer is spent on single commodity. If consumer spends his entire income on two commodities, he will go on substituting the commodity giving low marginal utility with commodity giving high marginalutility till the marginal utilities of both the commodities become equal assuming that prices ofboth the commodities are same. In indifference curve analysis, the concepts i.e., definition of indifference curve, marginal rate of substitution, budget line and consumer equilibrium have been examined. In indifference curve analysis, consumer is said to be in equilibrium when consumer buys that combination of two commodities which yields him maximum satisfaction with given income and prices. Moreover, he does not want to make any change in his current

spending. Cardinal utility analysis as well as indifference curve analysis are of utmost importance in certain fields of real life but, at the same time, both the analysis suffers from various limitations also. According to various economists, although both the analysis has many similarities, yet indifference curve analysis is superior to cardinal utility analysis.

3.5 Questions for Practice

A. Short Answer Type Questions

Q1. Explain the relationship between total and marginal utility with the help ofdiagram.

Q2. List the assumptions of cardinal utility analysis.

Q3. What do you mean by Law of diminishing marginal utility?

Q4. Give an example and draw a diagram for law of equi-marginal utility

Q5. Explain Consumer's Equilibrium with Single Commodity through example.

Q6. Discuss Consumer's Equilibrium of two Commodities with the help of suitable example.

Q7. What do you mean by indifference curve?

Q8. Explain the concept of Consumer Equilibrium.

Q9. What is the meaning of price line under indifference curve?

B. Long Answer Type Questions

Q1. What are the laws of cardinal utility? Give assumptions.

Q2. Discuss the consumer's equilibrium under cardinal utility analysis with the helpof suitable diagrams.

Q3. Critically evaluate the Cardinal Utility Analysis.

Q4. Explain the effects of change in income and prices of commodities on budget line.

Q5. Explain the various properties of Indifference Curve Critically explainconsumer's equilibrium determined under indifference curve analysis.

Q6. Why indifference curve analysis is superior to cardinal utility analysis?

3.6 Suggested Readings

- H.L. Ahuja: Advanced Economic Theory (Microeconomic Analysis).
- A. Koutsoyiannis: Modern Microeconomics.
- K.N. Verma: Micro Economic Theory.

BACHELOR OF ARTS

SEMESTER–I

COURSE: MICRO ECONOMICS

UNIT 4: CONSUMER BEHAVIOUR: INDIFFERENCE CURVE ANALYSIS

STRUCTURE

4.0 Learning Objectives

At the end of this unit, learner will be able to:

- Meaning of IC
- Derive the consumer's equilibrium under the indifference curve analysis

- Explain the superiority of indifference curve analysis over cardinal utility analysis.

4.1 Introduction

The oldest theory of demand is the cardinal utility analysis which examines consumer's demand for a good and provides the law of demand which highlights that there is inverse relationship quantity demanded of a commodity and its price. As per the cardinal utility, it means the level of satisfaction of the consumer. As a result of the criticism of cardinal utility analysis, various theories have been established namely Indifference Curve Analysis, Samuelson's Revealed Preference Theory, and Hick's Logical Weak Ordering Theory. In this unit, cardinal utility analysis and indifference curve analysis have been explained.

4.2 Indifference Curve Analysis

The cardinal utility analysis is based on several assumptions which have been criticized by various economists. It is due to the shortcomings of cardinal utility analysis that ordinal utility analysis or indifference curve analysis was developed. According to ordinal utility analysis, utility can be ranked like first, second, third etc. based on preference of the consumer for various commodities. Indifference curve analysis was first of all developed by Edgeworth in 1881. Later on, this concept was developed by Pareto in 1906, W.E. Johnson in 1913 and Slustky in 1915. The significant contribution has been made by Hicks and Allen towards the development of this analysis. J.R. Hicks in his book, "Value and Capital" has provided detailed analysis of ordinal utility in which he has explained behaviour of the consumer in scientific manner.

4.2.1 Assumptions of Indifference Curve Analysis

The indifference curve analysis is based on several assumptions. These are as follows:

1. The consumer is rational in nature as he wants to get maximum satisfaction out of his limited income.
2. Utility can be ranked in ordinal numbers like first, second, third etc. on the basis of preference of the consumer for various commodities.
3. This analysis is based on the assumption that marginal rate of substitution diminishes. If amount of any commodity increases with the consumer, then he will substitute that commodity with another at diminishing rate.
4. The consumer never reaches the level of satiety. He always wants more amount of a commodity to the lesser amount of it. For example, combination X includes 3 units of

apples and 5 units of mangoes and combination Y includes 3 units of apples and 3 units of mangoes. The combination X is better than Y as X includes more units of mangoes.

5. This analysis is based on the assumption of consistency which means if consumer preferscombination X to Y in a given time period, he will not prefer Y to X in another time period rather will prefer X to Y only.
6. According to the assumption of transitivity of this analysis, if consumer prefers combination X to combination Y and combination Y to combination Z, he will surely prefer combination X to combination Z. Similarly, if consumer is indifferent among combinations X and Y as well as combinations Y and Z, he will surely be indifferent among combinations X and Z.
7. In this analysis, scale of preference will be independent of the income of consumer as well as price of commodity in the market. Moreover, scale of preference of one consumer will be independent of the scale of preference of another consumer.
8. Indifference curve analysis is based on the assumption of continuity. According to this assumption, indifference curve can provide various combinations of two commodities which gives equal level of satisfaction to the consumer and consumer is indifferent about these combinations.

4.2.2 Meaning of Indifference Curve

Table 4: Indifference Schedule

Combinations	Mangoes	Kiwis	Marginal Rate of Substitution
V	1	20	-
W	2	14	6:1
X	3	9	5:1
Y	4	5	4:1
Z	5	2	3:1

An indifference curve is the locus of all those points representing various combinations of two commodities giving same level of satisfaction to the consumer. If all the combinations on given indifference curve provide same level of satisfaction to the consumer, then he will be indifferent among the available combinations. According to Leftwitch, “A single indifference curve shows the different combinations of X and Y that yield equal satisfaction to the

onsumer." Indifference Schedule is a table representing the various combinations of two goods that will give equal level of satisfaction to the consumer. Table 4 represents the indifference schedule in which five combinations of mangoes and kiwis have been shown. The five combinations V, W, X, Y and Z yield equal level of consumer satisfaction. The combination V includes 1 mango and 20 kiwis, combination W includes 2 mangoes and 14kiwis, combination X includes 3 mangoes and 9kiwis, and combination Y includes 4 mangoes and 5kiwis and combination Z includes 5 mangoes and 2kiwis. Here, to get one more mango consumer is sacrificing some units of kiwi to remain at the same level of satisfaction.

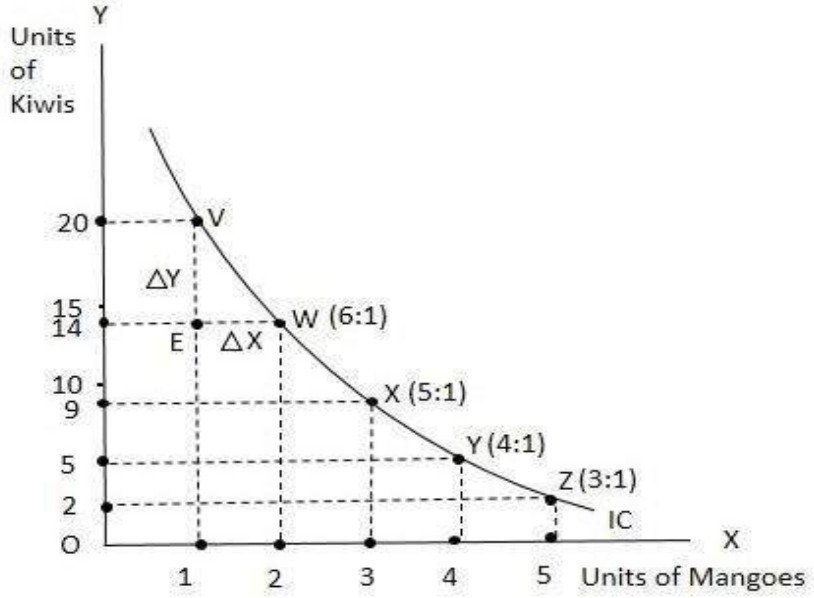


Figure 6: Indifference Curve

The figure 6 shows the indifference curve in which units of mangoes and units of kiwis have been measured on X axis and Y axis, respectively. IC is the indifference curve. The five combinations i.e., V (1 mango and 20 kiwis), W (2 mangoes and 14 kiwis), X (3 mangoes and 9 kiwis), Y (4 mangoes and 5 kiwis) and Z (5 mangoes and 2 kiwis) of mangoes and kiwis yields same level of satisfaction to the consumer. By joining these combinations, indifference curve can be drawn. Indifference curve is downward sloping from left to right and convex to the origin.

4.2.3 Indifference Map

Indifference curve shows the various combinations which provide same level of satisfaction to the consumer. So, consumer will be indifferent among these combinations. If consumer wants to attain higher level of satisfaction, then the combination providing higher level of satisfaction than the available combinations will not lie on the same indifference curve rather it will lie on some higher indifference curve. Similarly, if consumer wants to attain lower level

of satisfaction, then the combination providing lower level of satisfaction than the available combinations will not lie on the same indifference curve rather it will lie on some lower indifference curve. Therefore, there can be different indifference curves showing different level of satisfaction. A set of indifference curves showing different levels of satisfaction obtainable from different schedules of indifference is called indifference map. Higher the indifference curve, higher will be the level of satisfaction. Lower the indifference curve, lower will be the level of satisfaction. The indifference map has been shown in figure 7.

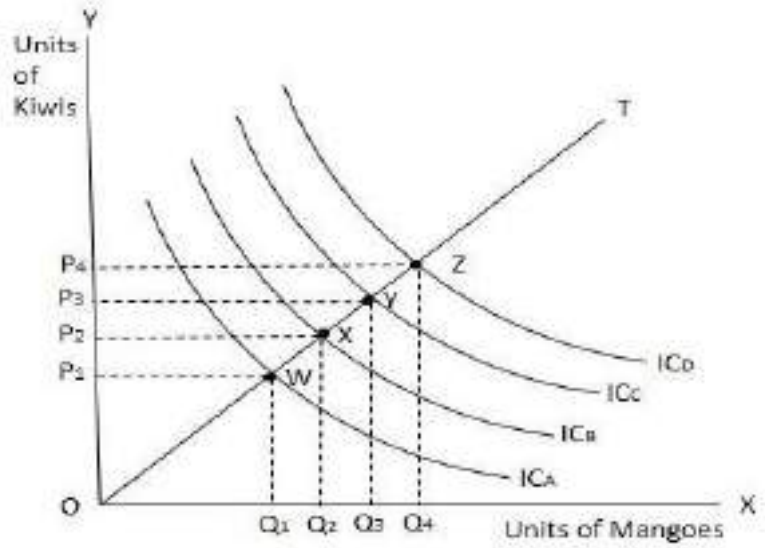


Figure 7: Indifference Map

In the figure, units of mangoes and units of kiwis have been measured on X axis and Y axis, respectively. The various indifference curves IC_A, IC_B, IC_C and IC_D represent indifference map. A straight-line OT passes through theses indifference curves. Combinations W, X, Y and Z lie on indifference curves IC_A, IC_B, IC_C and IC_D, respectively. The combination W includes OQ_1 mangoes and OP_1 kiwis as well as combination X includes OQ_2 mangoes and OP_2 kiwis. As combination X includes more quantity of mangoes and kiwis than combination W, combination X will provide higher level of satisfaction to the consumer than W. The combination Y includes OQ_3 mangoes and OP_3 kiwis as well as combination Z includes OQ_4 mangoes and OP_4 kiwis. As combination Z includes more quantity of mangoes and kiwis than combination Y, combination Z will provide higher level of satisfaction to the consumer than Y. Hence, combination on the higher indifference curve gives higher level of satisfaction and combination on the lower indifference curve provides lower level of satisfaction.

4.2.4 Marginal Rate of Substitution

The consumer can get same level of satisfaction from alternative combinations if the rise in

satisfaction due to increased quantity of mangoes is offset by the decline in satisfaction due to reduced quantity of kiwis. The marginal rate of substitution of X for Y is defined as the amount of Y the consumer is just willing to give up to get one more unit of X and maintain the same level of satisfaction. J.R. Hicks has defined marginal rate of substitution of X commodity for Y commodity as "the quantity of Y which would just compensate the consumer for the loss of marginal unit of X." The table 4 explains the concept of marginal rate of substitution. The combination V (1 mango and 20 kiwis) provides same level of satisfaction as combination W (2 mangoes and 14 kiwis) gives. The consumer has substituted 6 kiwis with 1 mango. Hence, marginal rate of substitution of mangoes for kiwis will be 6:1.

There are 3 mangoes and 9 kiwis in combination X. The consumer has substituted 5 kiwis with 1 mango to remain on the same level of satisfaction as that of combination W. Therefore, the marginal rate of substitution of mangoes for kiwis will be 5:1. Similarly, marginal rate of substitution will be 4:1 and 3:1 for combinations Y and Z, respectively. Marginal rate of substitution of X for Y can be explained as the ratio of change in amount of Y to a change in amount of X.

$MRS_{XY} = - \Delta Y/\Delta X$

where MRS_{XY} = Marginal rate of substitution of X for Y, ΔY = Change in amount of Y and

ΔX = Change in amount of X

The marginal rate of substitution is negative because the amount of Y is declined to get a marginal unit of X. The slope of indifference curve is measured by marginal rate of substitution so indifference curve slopes downwards. The figure 6 shows two combinations V and W of mangoes and kiwis on the given indifference curve IC. The consumer sacrifices VE amount of kiwis to get the marginal amount EW of mangoes.

$MRS_{XY} = VE/EW$

The law of diminishing marginal rate of substitution has been developed by Prof. Lerner. According to this law, the consumer will be willing to forgo smaller and smaller units of Y in order to have successive additional units of X. According to Ferguson, "The law of diminishing marginal rate of substitution states that as X is substituted for Y so as to leave the consumer on the same indifference curve, the marginal rate of substitution of X for Y diminishes." The table 4 shows that consumer sacrifices 6 kiwis to get second mango, 5 kiwis to get third mango, 4 kiwis to get fourth mango and 3 kiwis to get fifth mango. This shows that marginal rate of

substitution of mangoes for kiwis goes on diminishing. In figure 6, it has been shown that when consumer moves from combination V to W, he sacrifices 6 kiwis to get one more mango where marginal rate of substitution of mangoes for kiwis is 6:1. When consumer moves from combination W to X, he sacrifices 5 kiwis to get one more mango where marginal rate of substitution of mangoes for kiwis is 5:1. In case of two combinations

i.e. Y and Z, the marginal rate of substitution of mangoes for kiwis is 4:1 and 3:1, respectively. Therefore, as consumer increases the consumption of mangoes then for getting every additional unit of mango he sacrifices less and less amount of kiwis i.e. 6:1, 5:1, 4:1 and 3:1, respectively. This is called diminishing marginal rate of substitution. The marginal rate of substitution diminishes due to two reasons. Firstly, particular want of consumer can be satisfied. As consumer has more and more units of a given good, his want to get more of its quantity becomes less intensive. So, consumer wants to sacrifice fewer units of other good to get marginal unit of a given good. Secondly, goods are imperfect substitute of each other. The marginal rate of substitution of X for Y diminishes when the amount of X is increased as goods are imperfect substitute. If goods are perfect substitute for each other, these will be regarded as same. Any change in amount of one or the other good will be regarded as the changes in the quantity of same good. So, marginal rate of substitution will remain the same. Therefore, decline in marginal rate of substitution can be attributed to the commodities being imperfect substitutes of each other. The law of diminishing marginal rate of substitution is not applicable to perfect substitutes and perfect complimentary goods.

Check Your Progress- II

Q1. Define Indifference Curve?

Ans:_____

_____

Q2. Explain Marginal Rate of Substitution.

Ans:_____

_____

4.3 Properties of Indifference Curve

The properties of indifference curve are as follows:

1) **An indifference Curve Slopes Downwards from Left to Right:** The various combinations which lie on the same indifference curve give same level of satisfaction. This

is possible only if increase in amount of commodity A is accompanied by reduction in amount of commodity B because rise in satisfaction of commodity A is offset by decline in satisfaction of commodity B. If Indifference curve slopes downwards from left to right, all the combinations on this curve will give same level of satisfaction. If the shape of indifference curve is a horizontal straight line, vertical straight line and upward sloping curve then compensating variations in satisfaction will not take place and consumer will not be indifferent among the various combinations lying on these curves.

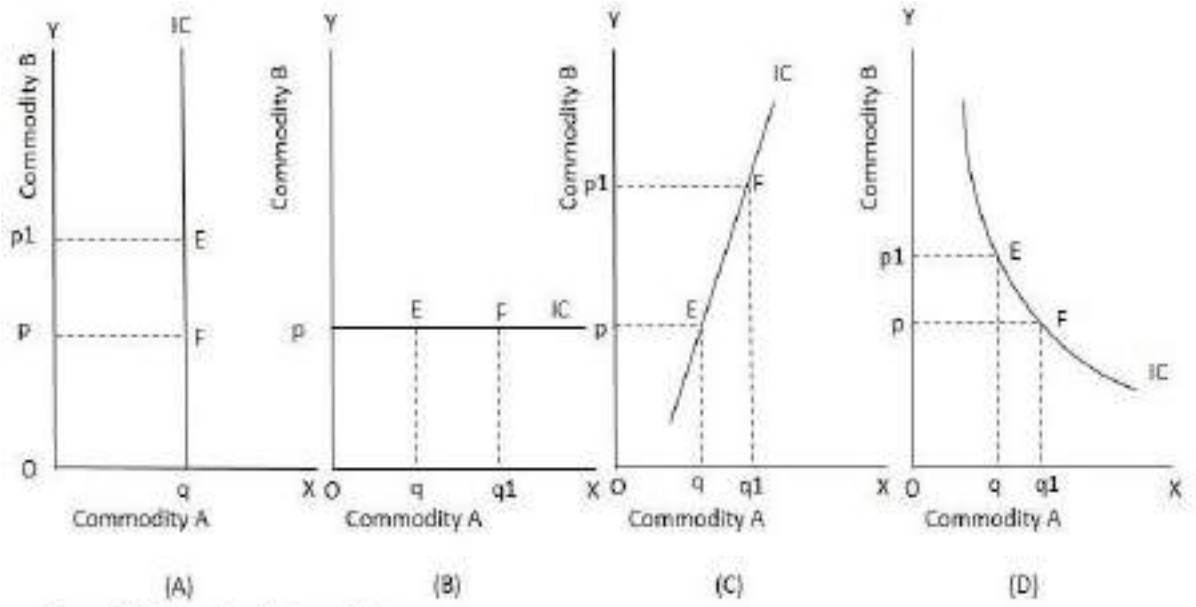


Figure 8: Slope of Indifference Curve

In figure 8, slope of indifference curve has been analysed. In the various parts of this figure i.e. A, B, C and D, commodity A and commodity B have been measured on X axis and Y axis, respectively. In figure 8 (A), the two combinations E and F lie on the indifference curve IC. The combination E includes Oq of commodity A and Op1 of commodity B. The combination F includes Oq of commodity A and Op of commodity B. Both the combinations E and F include same quantity of commodity A. The combination E includes more quantity of commodity B than combination F. So, combination E gives more satisfaction to the consumer and he cannot be indifferent among combinations E and F. Hence, indifference curve cannot be a vertical straight line. In figure 8 (B), the two combinations E and F lie on the indifference curve IC. The combination E includes Oq of commodity A and Op of commodity B. The combination F includes Oq1 of commodity A and Op of commodity B. Both the combinations E and F include same quantity of commodity B. The combination F includes more quantity of commodity A than combination E. So, combination F gives more satisfaction to the consumer and he cannot be indifferent among combinations E and F. Hence, indifference curve cannot be a horizontal

straight line.

In figure 8 (C), the two combinations E and F lie on the indifference curve IC. The combination E includes Oq of commodity A and Op of commodity B. The combination F includes Oq1 of commodity A and Op1 of commodity B. The combination F includes more quantity of commodity A and B than combination E. So, combination F gives more satisfaction to the consumer and he cannot be indifferent among combinations E and F. Hence, indifference curve cannot be an upward sloping curve.

In figure 8 (D), the two combinations E and F lie on the indifference curve IC. The combination E includes Oq of commodity A and Op1 of commodity B. The combination F includes Oq1 of commodity A and Op commodity B. The combination E includes more of commodity B and less of commodity A than combination F. Hence, gain in satisfaction of commodity B is offset by decline in satisfaction of commodity A. So, combinations E and F gives equal level of satisfaction to the consumer and he is indifferent among combinations E and F. Hence, indifference curve can only be a negatively sloping curve which slopes downward from left to right.

2) **An indifference is Convex to the Origin:** An Indifference curve is convex to the point of origin. This property of indifference curve is based on the law of diminishing marginal rate of substitution. According to law of diminishing marginal rate of substitution, indifference curve cannot be a straight line and concave to the origin rather it can only be

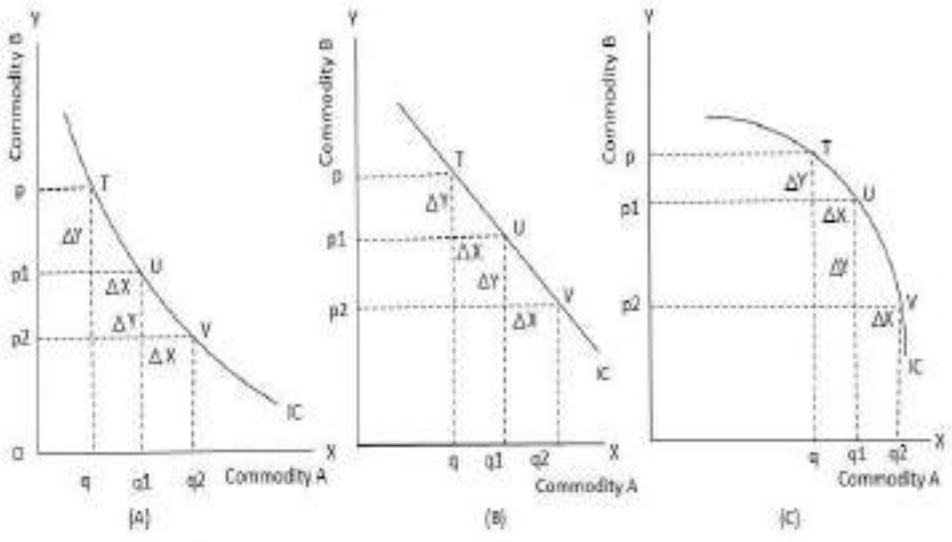


Figure 9: Shape of Indifference Curve

convex to the origin. This property of indifference curve can be explained with the help of figure 9. In the various parts of this figure i.e. A, B and C, commodity A and commodity B have been measured on X axis and Y axis, respectively. In figure 9 (B), indifference curve IC

is a straight line which shows that marginal rate of substitution of commodity A for commodity B is constant. It is because, to increase qq1 amount of commodity A, consumer is sacrificing pp1 amount of commodity B. Further, to increase q1q2 amount of commodity A, consumer is reducing p1p2 amount of commodity B. To increase the amount of commodity A, consumer is sacrificing same amount of commodity B i.e. pp1=p1p2. This is possible only in case of perfect substitutes.

In figure 9 (C), indifference curve IC is concave to the origin which shows that marginal rate of substitution of commodity A for commodity B is increasing. It is because, to increase qq1 amount of commodity A, consumer is sacrificing pp1 amount of commodity B. Further, to increase q1q2 amount of commodity A, consumer is reducing p1p2 amount of commodity B. To increase the amount of commodity A, consumer is sacrificing more amount of commodity B i.e. pp1 < p1p2. This shows that as the consumption of commodity A is increasing, its importance is also increasing which is not possible in reality. In figure 9 (A), indifference curve IC is convex to the origin which shows that marginal rate of substitution of commodity A for commodity B is diminishing. It is because, to increase qq1 amount of commodity A, consumer is sacrificing pp1 amount of commodity B. Further, to increase q1q2 amount of commodity

A, consumer is reducing p1p2 amount of commodity B. To increase the amount of commodity A, consumer is sacrificing less amount of commodity B i.e. pp1>p1p2. This shows that as the consumption of commodity A is increasing, its importance is declining which perfectly fits the real world. Hence, indifference curve is convex to the origin.

3) **Higher the Indifference Curve, Higher is the Level of Satisfaction and Vice-Versa:** In Indifference map, all the combinations on higher indifference curve will provide higher level of satisfaction than the

combinations on the lower indifference curve. In figure 10, commodity A is measured on X axis and commodity B on Y axis. There are three combinations W, X and Y which lie on the different indifference curves IC_T, IC_S and IC_R, respectively. The combination W includes OQ_1 amount of commodity A and OP_1 amount of commodity B, X includes OQ_2 amount of commodity A and OP_1 amount of commodity B and Y includes OQ_3 amount of commodity A and OP_1 amount of commodity B. All the combinations have same amount of commodity B. The combination Y has more amount of commodity A than X and combination X have more quantity of commodity A than W i.e. $OQ_3 > OQ_2 > OQ_1$. Hence, Combination Y gives more satisfaction than X and X gives more satisfaction than W. So, higher the indifference curve,

higher will be the level of satisfaction and vice-versa.

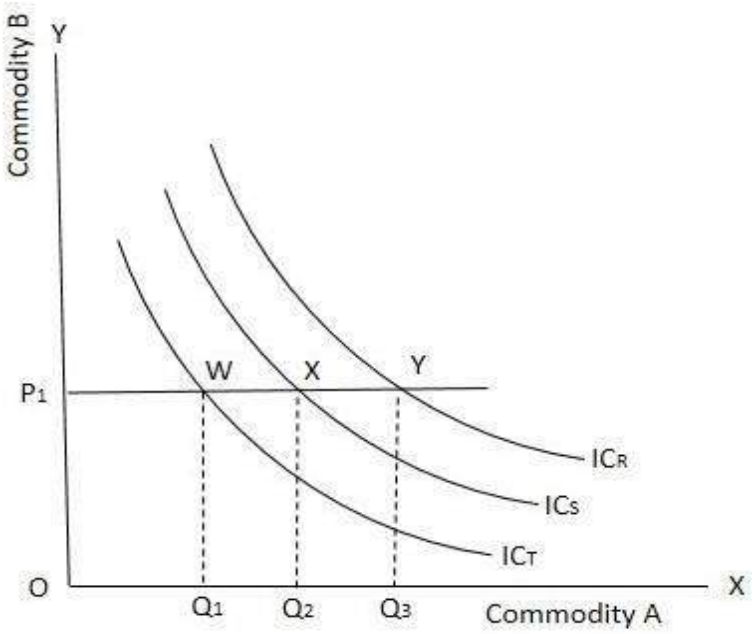


Figure 10: Indifference Map

4) **Indifference Curves Cannot Intersect Each Other:** Each indifference curve provides different level of satisfaction. So, they cannot intersect each other. This property can be explained with the help of figure 11 in which two indifference curves are intersecting each other. The commodity A is measured on X axis and commodity B on Y axis. The combinations W and P lie on ICS indifference curve which shows that both gives same level of satisfaction i.e. W=P. The combinations W and Q lie on ICT indifference curve which means both gives equal level of satisfaction i.e. W=Q. Hence, combinations P and Q gives same level of satisfaction i.e. P=Q. But it is not possible as P lies on higher

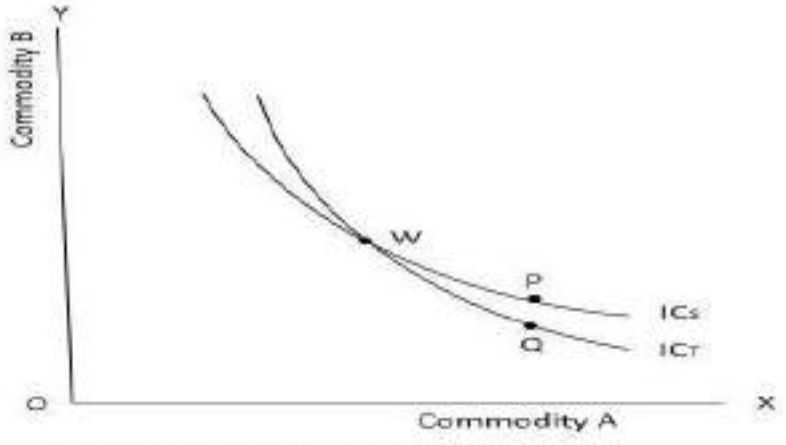


Figure 11: Indifference Curves

indifference curve and Q lies on lower indifference curve. Therefore, indifference curves cannot intersect each other.

5) **Indifference Curve Can Neither Touch Horizontal Nor Vertical Axis:** An indifference curve can never touch X axis and Y axis. This property of indifference curve can be explained with the help of figure 12 in which commodity A is measured on X axis and commodity B on Y axis. The indifference curve IC_T touches X axis at Q and at combination Q, consumer has OQ amount of commodity A and zero amount of commodity B which is not the proper combination. This shows that consumer is purchasing single commodity. So, indifference curve cannot touch X axis.

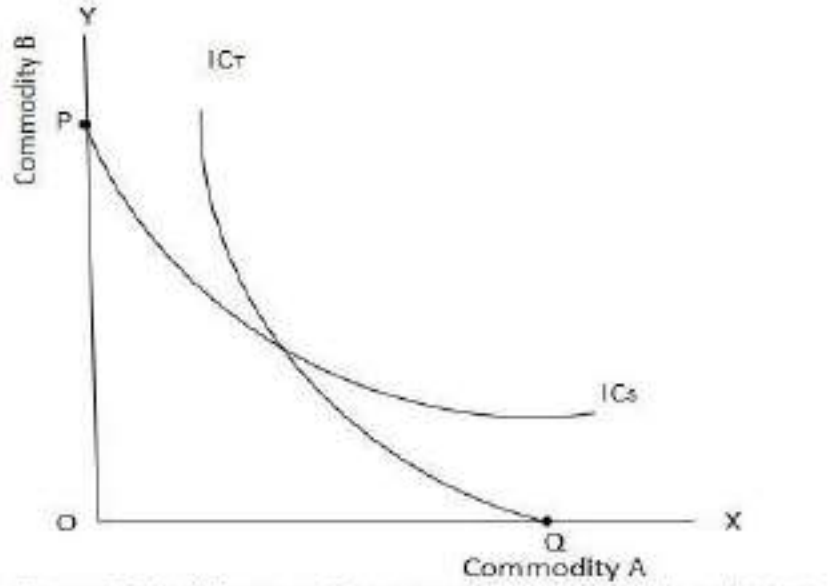


Figure 12: Indifference Curve never touches X axis and Y axis

The indifferenc curve IC_S touches Y axis at P and at combination P, consumer has OP amount of commodity B and zero amount of commodity A which is not the proper combination. This shows that consumer is purchasing single commodity. So, indifference curve cannot touch Y axis. Hence, indifference curve can neither touch horizontal nor vertical axis.

6) **Indifference Curves May or May Not be Parallel:** It is not necessary that indifference curves are parallel to each other rather they may or may not be parallel to each other. This property of indifference curve depends upon marginal rate of substitution of two curves. If marginal rate of substitution of different points on two curves declines at constant rate, then both the curves will be parallel to each other, otherwise, both will not be parallel.

7) **Shapes of Indifference Curves in Case of Perfect Substitutes and Perfect Compliments:** In case of perfect substitutes, indifference curve will be a downward sloping straight line from left to right and in case of perfect substitutes, indifference curve will be a right-angled curve. In figure 13 (A), indifference curve IC is a straight line which shows that marginal rate of substitution of commodity A for commodity B is constant. It is because, to purchase first unit

of commodity A, consumer is sacrificing one unit of commodity B. Further, to purchase second of commodity A, consumer is sacrificing one more unit of commodity B. To increase the amount of commodity A, consumer is

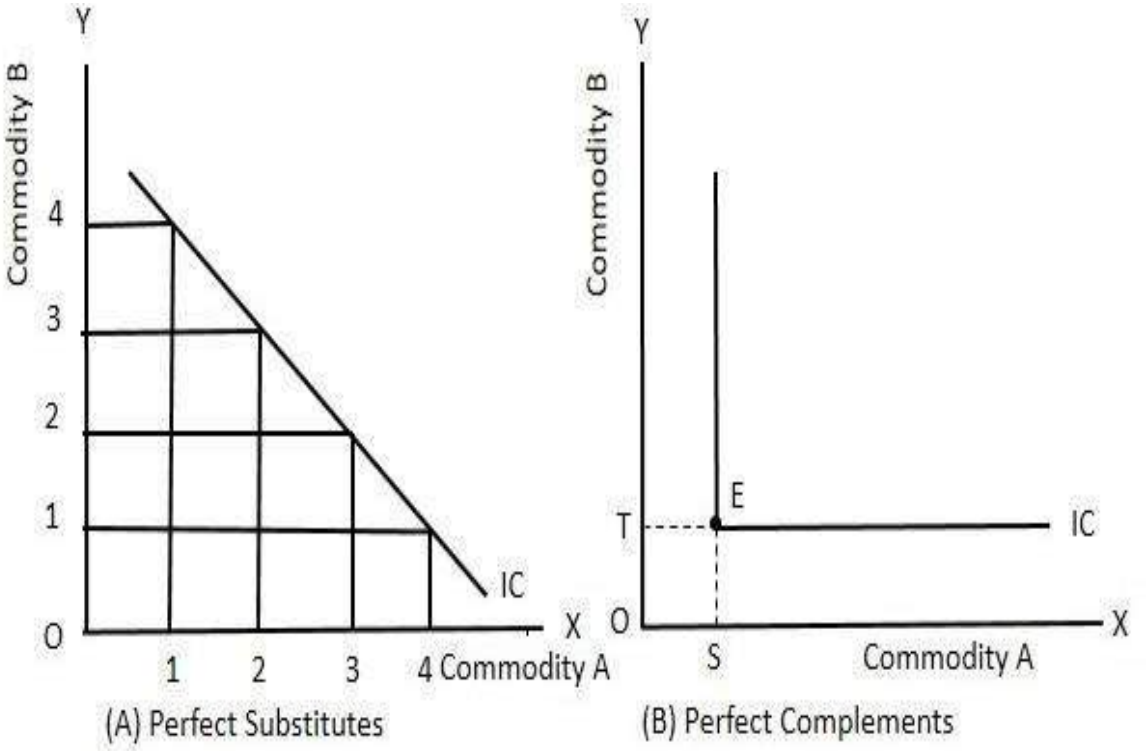


Figure 13: Shape of Indifference Curve

sacrificing same amount of commodity B. This is possible only in case of perfect substitutes. In figure 14 (B), indifference curve IC is a right angled curve which shows that both the commodities A and B are purchased in fixed proportion by the consumer. At point E, consumer has fixed proportion combination of OS of commodity A and OT of commodity B.

8) Indifference Curve Becomes Complex in Case of More than Two Commodities

When the consumer wants to have combinations of more than two commodities i.e., 3 commodities, 4 commodities etc., then we have to draw a three dimensional indifference curves which are very difficult to draw.

4.4 Price Line

Indifference curve is the locus of all those combinations of two commodities which give same level of satisfaction to the consumer. Now, the question arises whether the consumer can purchase certain combinations or not.

Table 5: Possible Combinations of A and B		
Combinations	Commodity A (Rs.6)	Commodity B (Rs.3)
P	0	10
Q	1	8
R	2	6
S	3	4
T	4	2
U	5	0

This is determined by money income of the consumer as well as prices of two commodities. The price line shows all those combinations of two commodities which can be bought by the consumer with the given money income and given prices of two commodities. According to Ferguson, "The price line shows the combinations of goods that can be purchased if the entire money income is spent." The price line is also known as budget line and opportunity line.
The equation of the price line can be written as follows:

$M=P_A.A+P_B.B$

where M = Money Income, P_A = Price of Commodity A, A = Quantity of Commodity A, P_B = Price of Commodity B, B = Quantity of Commodity B.

The table 5 shows the possible combinations of commodities A and B which consumer can buy with given income and prices. Suppose consumer has Rs. 30 with him and the price of commodity A and B is Rs. 6 and Rs. 3,respectively. If consumer want to purchase only commodity A then he can buy 5 units, each

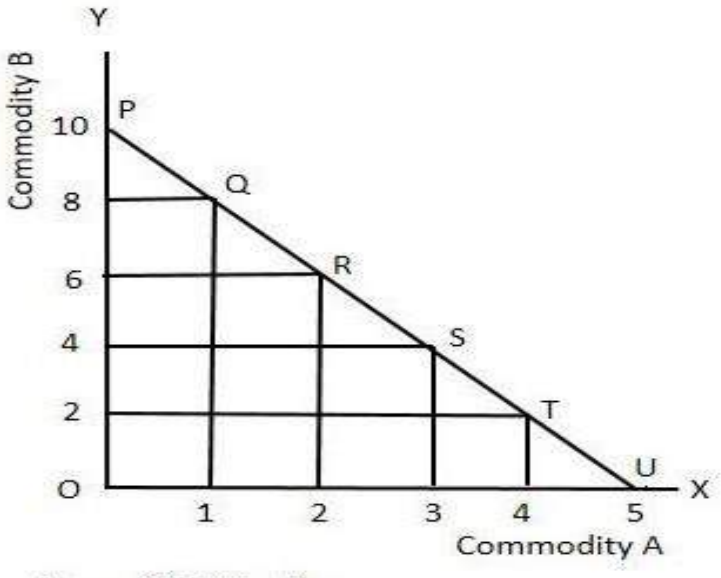


Figure 14: Price Line

costs Rs. 6, with entire income. Similarly, if consumer wants to purchase only commodity B then he can buy 10 units, each costs Rs. 3, with entire income. The other combinations available to consumer are Q (1 unit of commodity A + 8 units of commodity B), R (2 units of commodity A + 6 units of commodity B), S (3 units of commodity A + 4 units of commodity B) and T (4 units of commodity A + 2 units of commodity B) which he can buy with given income at given prices. Figure 14 shows the various combinations that lie on price line. The commodity A and commodity B have been measured on X axis and Y axis, respectively. PU is the price line which shows various combinations P, Q, R, S, T and U which he can buy with his given income at given prices. If there is any combination which is right to the price line, then consumer cannot buy that with given money income. If, there is any combination which is left to the price line, then consumer can buy that but his entire money income is not spent. The slope of price line refers to the ratio of prices of two commodities i.e. A and B.

Slope of Price Line = P_A/P_B

where P_A = Price of commodity A and P_B = Price of commodity B

The position and slope of price line depends upon two factors (i) income of the consumer (ii) prices of the two goods. These factors have been explained as follows:

(A) Effects of Change in Income: If prices of the goods remain same but income of the consumer changes, it will only change the position of the price line not the slope. As income increases, the price line

will shift to the right of the original price line and as income declines, price line will shift to the left of the original price line at given prices. The effects of change in income on price line has been shown in the figure 15.

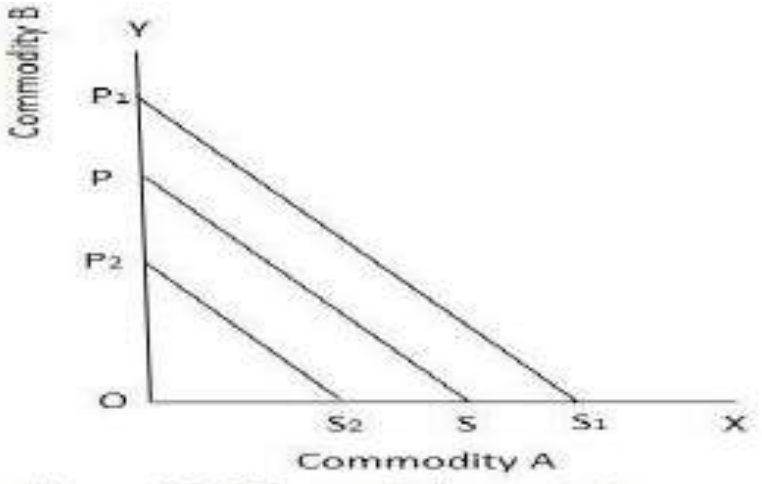


Figure 15: Effects of change in Income

The original price line is PS. With increase in income, price line will shift from PS to P_1S_1 and with decline in income, price line shifts from PS to P_2S_2.

At PS, the maximum amount that consumer can buy is OS amount of commodity A and OP amount of commodity B. At P_1S_1, the maximum amount that consumer can buy is OS_1 amount of commodity A and OP_1 amount of commodity B which is higher than the maximum amount of both the commodities on PS price line. At P_2S_2, the maximum amount that consumer can buy is OS_2 amount of commodity A and OP_2 amount of commodity B which is lower than the maximum amount of both the commodities on PS price line.

(B**)Effects of change in Prices:** If the income of the consumer is given, the proportionate change in all money prices will shift the price line to left of original price line with increase in prices and to right of original price line with decrease in prices. The figure 16

(A) shows the effects of proportionate change in prices. The original price line is PS. With decrease in prices, price line will shift from PS to P_1S_1 and with increase in prices, price line shifts from PS to P_2S_2. At PS, the maximum amount that consumer can buy is OS amount of commodity A and OP amount of commodity B. At P_1S_1, the maximum amount that consumer can buy is OS_1 amount of commodity A and OP_1 amount of commodity B which is higher than the maximum amount of both the commodities on PS price line. At P_2S_2, the maximum amount that consumer can buy is OS_2 amount of commodity A and OP_2 amount of commodity B which is lower than the maximum amount of both the commodities on PS price line.

If the price of one commodity i.e. commodity A changes and price of commodity B as well as money income remain constant, the one end of price line where we measure commodity B will remain at same point and other end where we measure commodity A changes with change in price of commodity A. This can be explained with the help of figure 16 (B).

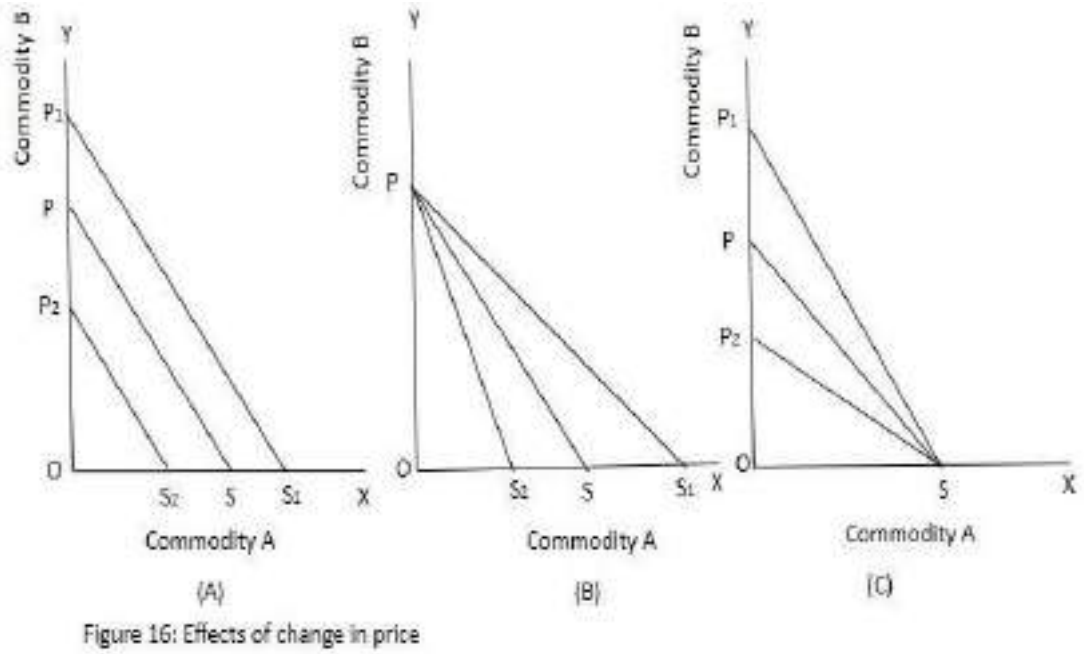


Figure 16: Effects of change in price

The original price line is PS. With decrease in prices, price line will shift from PS to PS1 and with increase in prices, price line shifts from PS to PS2. At PS1, consumer can buy more quantity of commodity A than on price line PS i.e., OS1> OS. At PS2, consumer can buy less quantity of commodity A than on price line PS i.e., OS2< OS. If the price of one commodity i.e. commodity B changes and price of commodity A as well as money income remain constant, the one end of price line where we measure commodity A will remain at same point and other end where we measure commodity B changes with change in price of commodity B. This can be explained with the help of figure 16 (C). The original price line is PS. With decrease in prices, price line will shift from PS to P1Sand with increase in prices, price line shifts from PS to P2S. At P1S, consumer can buy more quantity of commodity B than on price line PS i.e. OP1> OP. At P2S, consumer can buy less quantity of commodity B than on price line PS i.e. OP2< OP. Hence, slope of price line changes with change in price of one commodity, while the price of other commodity and money income remains the same.

4.5 Consumer Equilibrium

The consumer is said to be in equilibrium when consumer with given income and prices buys that combination of two commodities which yields him maximum satisfaction and he does not want to make any change in his spending.

Assumptions

The various assumptions of consumer's equilibrium under indifference curve analysis are as

follows:

1) Consumer is rational in nature as he wants to maximise his utility.
2) The prices of the commodities will remain constant.
3) The money income of the consumer will be constant.
4) Consumer has knowledge about price of all the commodities.
5) There exists perfect competition in the market.
6) Commodities are divisible.
7) Consumer has complete knowledge about indifference map.
8) Income will be spent in small quantities by consumer.

There are two main conditions to attain equilibrium of consumer under indifference curve analysis.

These are

(i) The price line should be tangent to indifference curve.

(ii) The indifference curve must be convex to the origin at the point of tangency.

The first condition for consumer's equilibrium is that price line should be tangent to indifference curve which has been shown in figure 17.

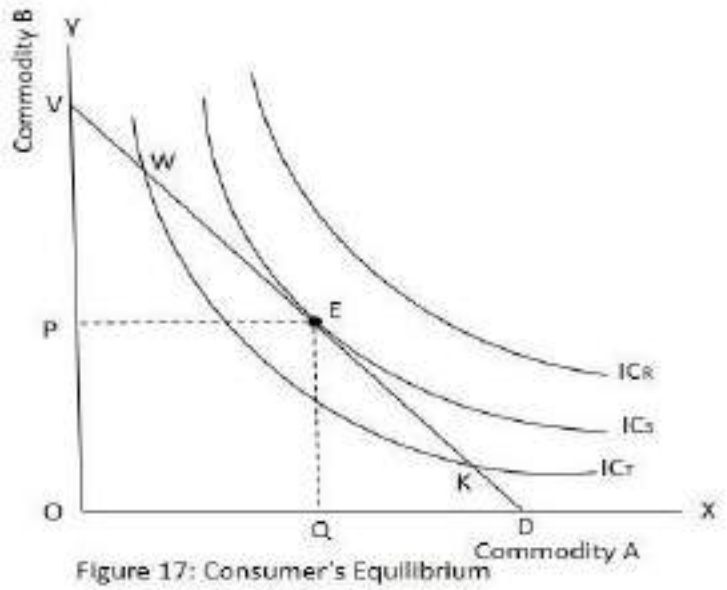


Figure 17: Consumer's Equilibrium

In figure 17, VD is the price line and IC_R, IC_S and IC_T are the indifference curves. The consumer can buy any combination i.e. E, W and K but he cannot buy any combination on IC_R

because it is away from price line

VD.Out of E, W and K, consumer will be in equilibrium at point E as at this point price line is tangent to the higher indifference curve ICS. At point E, consumer will buy OQ amount of commodity A and OP amount of commodity B which yields maximum satisfaction to the consumer. At points W and K, consumer will not get maximum satisfaction as both the points lie on the lowest indifference curve ICT.At equilibrium point E, slope of indifference curve and price line coincide. Slope of indifference curve shows marginal rate of substitution of commodity A for commodity B (MRSXY) and slope of price line is the ratio of price of commodity A (PX) and price of commodity B (PY). At the point of equilibrium, slope of indifference curve is equal to the slope of price line. It can be written as:

$MRS_{XY} = P_X/P_Y$

The second condition for consumer's equilibrium is that indifference curve should be convex to the origin at the point of tangency which has been shown in figure 18. In figure 18, VD is the price line and ICS and ICT are the indifference curves. The consumer can buy any combination i.e. E and E1. At E1, price line is tangent to indifference curve but indifference curve is concave to the origin at the point of tangency which

shows that second condition for equilibrium is not fulfilled and also point E1 lie on lower

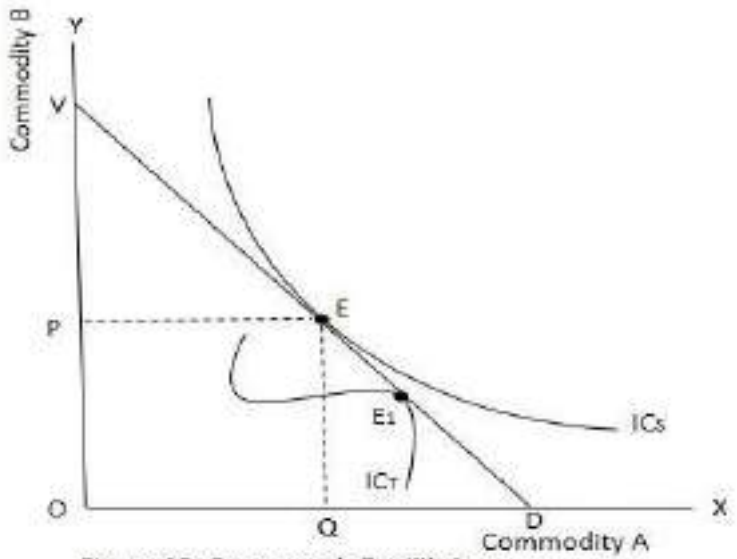


Figure 18: Consumer's Equilibrium

indifference curve ICT. So, consumer will not be in equilibrium at point E_1 rather at point E. At point E, both the conditions for consumer's equilibrium are fulfilled. The consumer will buy OQ amount of commodity A and OP amount of commodity B which gives maximum satisfaction to the consumer.

4.6 Criticism of Indifference Curve Analysis

1) Indifference curve analysis is based on unrealistic assumptions i.e. rational consumer, perfect knowledge of scale, divisibility of goods and perfect competition. The spending of a consumer is generally based on habits, fashion and customs. Hence, a consumer does not always behave rationally. It is not possible that consumer has complete knowledge of his indifference map. Divisibility of goods is not possible in case of most of the goods and perfect completion is not a reality rather it's a myth.

2) Prof. D.H. Robertson has highlighted that the indifference curve analysis is only "An old wine in new bottle."This analysis is similar to the cardinal utility analysis as it has only given new names to old concepts. The term 'utility' has been replaced by scale of preference, law of diminishing marginal utility has been substituted with diminishing marginal rate of substitution and the concept of cardinal numbers i.e. 1, 2, 3 etc., has been labelled as ordinal numbers i.e. I, II, III, etc.In cardinal utility analysis, consumer is in equilibrium when ratio of marginal utilities of two commodities is equal to the ratio of price of two commodities i.e.

$$\text{MU of A / MU of B} = P_A / P_B$$

In indifference curve analysis, consumer is in equilibrium when marginal rate of substitution of A for B is equal to the ratio of prices of two commodities i.e.

$$MRS_{AB} = P_A / P_B$$

Marginal rate of substitution is the ratio of marginal utilities of two commodities

i.e. $MRS_{AB} = MU_A / MU_B$

Hence, $$\text{MU of A / MU of B} = P_A / P_B$$

Therefore, conditions for consumer equilibrium are same in both the analysis.

3) According to Prof. W.E. Armstrong, a consumer is indifferent among close alternative combinations only as he cannot find the difference between the two. As the difference among various combinations rises, the difference in the satisfaction of alternative combinations become

clear and, therefore, different combinations which lie on the same indifference curve do not provide equal level of satisfaction. If argument of Armstrong is considered, different combinations on same indifference curve provide different level of satisfaction. Therefore, indifference curve will become non-transitive.

4) Indifference curve analysis fails to explain, how consumer behave when he has to make a choice among alternative combinations which involve risk or uncertainty of expectation. In order to choose among uncertain combinations, quantitative measurement of utility is required to determine whether the risk is worth taking. In these situations, cardinal measurement of utility can prove to be helpful to explain consumer behaviour.

5) Indifference curve analysis is based on absurd and unrealistic combinations. When consumer considers various combinations of two commodities, then some of the combinations are meaningless and it is not possible to apply theses combinations in the real life.

6) Indifference curve analysis can easily explain consumer behaviour in respect of two commodities but when consumer considers more than two commodities, this analysis becomes complex in nature.

7) Schumpeter has said that indifference curve is not based on real life experiences rather on imaginary combinations. Every time, it is not possible for a consumer to do calculations and decide like a computer as to which combination of two commodities he would like.

8) The indifference map is considered to be hypothetical as is not based on observed market behaviour. It is not objective in nature rather subjective as it does not set up functions and curves in purely objective terms. Purely objective indifference curves are possible only if quantitative data is obtained. The logical structure of indifference curve analysis is such that it is almost impossible to measure indifference curves quantitatively. Although efforts have been made to quantify indifference curve but not successful.

9) Indifference curve analysis is based on the weak ordering hypothesis i.e., consumers can be indifferent among a large number of combinations. However, according to Prof. Samuelson, it is not possible to find many situations of indifference in real world. The weak ordering makes it subjective in nature. However ordinal analysis is certainly better than cardinal analysis as it is based on fewer assumptions.

4.7 Comparison of Cardinal Utility Analysis and Indifference Curve Analysis

The cardinal utility analysis and indifference curve analysis has many similarities as well as dissimilarities.

Similarities

1) The cardinal utility analysis as well as indifference curve analysis are based on the assumption that consumer is rational in nature as he wants to maximise his satisfaction.

2) Both the analysis are subjective in nature as these are based on the concept of utility. In cardinal utility analysis, total utility is the summation of all the marginal utilities that the consumer derives from the consumption of various units of the commodity. In indifference curve analysis, total utility derived from the consumption of a commodity is based on the marginal utilities that the consumer derives from the consumption of various units of commodity.

3) In cardinal utility analysis, consumer is in equilibrium when ratio of marginal utilities of two commodities is equal to the ratio of price of two commodities i.e.

$$\text{MU of A / MU of B} = P_A / P_B$$

In indifference curve analysis, consumer is in equilibrium when marginal rate of substitution of A for B is equal to the ratio of prices of two commodities i.e.

$$MRS_{AB} = P_A / P_B$$

Marginal rate of substitution is the ratio of marginal utilities of two commodities i.e.

$$MRS_{AB} = MU_A / MU_B$$

$$\text{Hence MU of A / MU of B} = P_A / P_B$$

Therefore, conditions for consumer equilibrium are same in both the analysis.

4) Both the analysis are based on the law of diminishing marginal utility. In cardinal utility analysis, law of diminishing marginal utility applies. In indifference curve analysis, second condition for equilibrium is that indifference curve must be convex to the origin at the point of tangency which shows that marginal rate of substitution is diminishing at the point of equilibrium.

Dissimilarities

1) Indifference curve analysis is more realistic in nature as it is based on the ordinal measurement of utility i.e. first, second etc. Cardinal utility analysis is based on the assumption of cardinal

measurement of utility i.e. 1, 2, 3 etc. which is not possible in the real world.

2) Cardinal utility analysis is based on the assumption of constant marginal utility of money which is unrealistic in nature. Indifference curve is not based on this assumption.

3) Indifference curve analysis is based on less assumptions as compared to cardinal utility analysis. Hence, indifference curve analysis becomes more realistic in nature.

4) In cardinal utility analysis, marginal utility of money is assumed to be constant so it is not possible to divide price effect into income effect and substitution effect but in indifference curve analysis, it is possible to divide price effect into income effect and substitution effect. Indifference curve analysis provides more comprehensive explanation of theory of demand.

5) The Giffen's Paradox has been explained in indifference curve analysis but cardinal utility analysis failed to explain this concept.

6) The cardinal utility analysis has been based on the unrealistic assumption of independence of utilities but indifference curve analysis is free from this and has highlighted that substitute goods and complimentary goods are capable of influencing the utilities of each other.

7) Although both the analysis are based on the same equilibrium condition, yet indifference curve analysis is superior to cardinal utility analysis as it is based on less unrealistic assumptions.

8) Indifference curve analysis helps to highlight the effect of change in price on the welfare of consumer. If as a result of change in price, consumer moves from lower to higher indifference curve, his welfare is enhanced.

9) Both the analysis are subjective in nature but construction of preference schedule on the basis of changing physical quantities of two commodities and replacement of the law of diminishing marginal utility with diminishing marginal rate of substitution in case of indifference curve analysis indicates that this analysis is leading towards greater objectivity and behaviourism.

Check Your Progress -III

Q1. Why indifference curve slopes downwards from left to right?

Ans:_____

_____

Q2. Give any two properties of the indifference curve.

Ans:_____

_____

4.8 Summary

In indifference curve analysis, the concepts i.e., definition of indifference curve, marginal rate of substitution, budget line and consumer equilibrium have been examined. In indifference curve analysis, consumer is said to be in equilibrium when consumer buys that combination of two commodities which yields him maximum satisfaction with given income and prices. Moreover, he does not want to make any change in his current spending. Cardinal utility analysis as well as indifference curve analysis are of utmost importance in certain fields of real life but, at the same time, both the analysis suffers from various limitations also. According to various economists, although both the analysis has many similarities, yet indifference curve analysis is superior to cardinal utility analysis.

4.9 Questions for Practice

A. Short Answer Type Questions

Q1. What do you mean by indifference curve?

Q2. Explain the concept of Consumer Equilibrium.

Q3. Give any 4 properties of IC.

Q3. What is the meaning of price line under indifference curve?

B. Long Answer Type Questions

Q1. Explain the various properties of Indifference Curve Critically explain consumer's equilibrium determined under indifference curve analysis.

Q2. Why indifference curve analysis is superior to cardinal utility analysis?

4.10 Suggested Readings

- H.L. Ahuja: Advanced Economic Theory (Microeconomic Analysis).
- A. Koutsoyiannis: Modern Microeconomics.
- K.N. Verma: Micro Economic Theory.

BACHELOR OF ARTS

SEMESTER–I

COURSE: MICROECONOMICS

UNIT 5: PRODUCTION FUNCTION: LAW OF VARIABLE PROPORTIONS AND RETURNS TO SCALE

STRUCTURE

5.0 Learning Objectives

After completion of this unit, learner will be able to:

- Describe the meaning of production function
- Identify different types of production function
- Differentiate between the law of variable proportion and law of returns to scale

5.1 Introduction

A product's supply depends upon its cost of production, which in turn depends upon the physical relationship between inputs and outputs as well as input prices. In deciding the cost of production, the physical relationship between inputs and outputs is crucial. Therefore, theory of production relates to the physical laws governing production of goods. The theory of production, like the theory of demand, examines how a producer or firm can use its capital effectively to maximize profit. They must make the following production decision:

(a) What should be produced by a firm?

(b) How should the firm produce?

(c) How much and at what price does the firm sell?

(d) What is the best way for the firm to market its product?

These decisions are critical in the production process because they determine the goals of the firm. In the forthcoming pages, we will thoroughly study these aspects of production.

5.2 Meaning of Production Function

Production function means transformation of physical inputs into physical outputs. The functional relationship between physical inputs and physical output of a firm is known as production function. Algebraically, it can be written as:

$Y = f(N, K, L, E)$

Basically, there are four factors of production i.e., land, labor, capital and entrepreneur. From the above equation it will be read as: Production (Y) is a function (*f*) of labour (N), capital (K), land (L) and entrepreneur (E). According to Koutsoyiannis, "The production is purely a technical relation which connects factor inputs and output." Watson defined production function as, "The relation between a firm's physical production and the material factors of production is called as

production function."

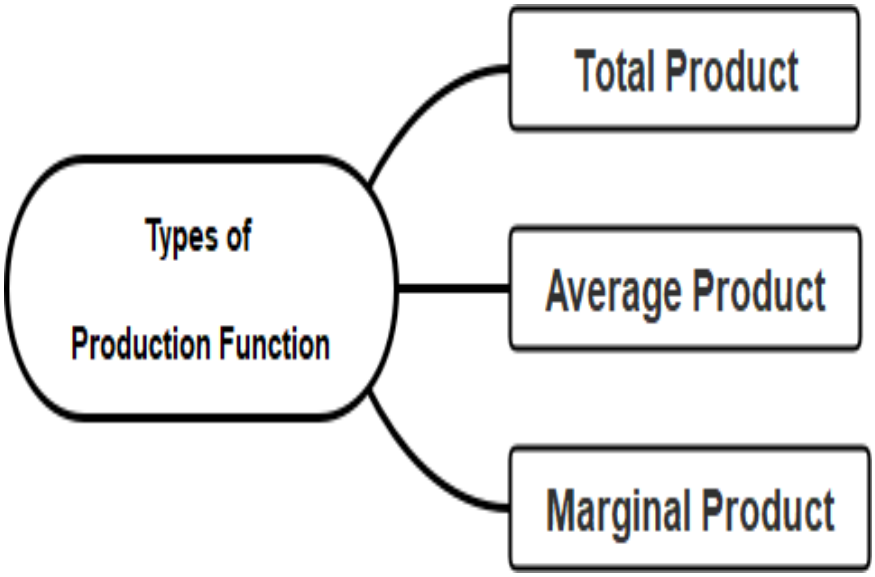
5.3 Types of Production Function

In economic theory, we are interested in two types of production functions. Firstly, when the quantities of some inputs are kept constant and the quantity of one input is varied. This kind of production function is called as the law of diminishing marginal returns or law of variable proportions and returns to a factor. It is important to note that returns to variable factors are relevant for the short run because in the short run some factors like, capital equipment, machines and land remained fixed and factors such as labour and raw material are increased to expand output. Secondly, the production functions with two or more than two variable factors which is called the law of returns to scale. The short run production function can be written as

$$Q = f(L, K)$$

In this, Q stands for output, L for labour and K for capital which is held constant in the short run. Thus, the concept of returns to a factor is concerned with the study of how output changes when the amount of variable factor, such as labour is increased.

To understand this, first we will study some concepts of physical products that are generally used for the study of returns to a variable factor. Regarding physical production of factors there are three concepts:



Total Product (TP): Total product of a variable factor is the amount of total output produced by a given quantity of the variable factor, keeping the quantity of other factors such as capital constant.

A. Average Product (AP): The average product of a variable factor (labour) is the total output divided by the amount of labour employed with a given quantity of fixed factors used to produce a commodity. Symbolically,

AP = Q/L

Here, AP = Average product, Q = Total output, L = Total units of variable factor (labour). It has been generally found that the average product is an indicator of productivity of the variable factor.

Table 1 Total Product, Marginal Product, and Average Product of Labour

Labour (No. of Workers)	**Total Product (TP)**	**verage Product (AP = Q/L)**	**Marginal Product (MP = ΔQ/ΔL)**
1	20	20	20
2	36	18	16
3	48	16	12
4	56	14	8
5	60	12	4
6	60	10	0
7	56	8	-4

B. Marginal Product (MP): The marginal product of a variable factor is the addition made to the total production by the employment of an extra unit of a factor.

Symbolically,

MP = $\Delta Q / \Delta L$

MP = marginal product of labour,

ΔQ = Change in total output,

ΔL = Change in = variable factor (labour).

It is important to note that the marginal product of a factor changes at different levels of employment of the factor. It has been found that the marginal product of a factor rises in the beginning and then

falls as more of it is used for production. The concepts of Total Product (TP), Marginal Product (MP) and Average Product have been explained with the help of a Table 1.

Check Your Progress-I

Q1. What is meant by production function?

Ans:_____

_____

Q2. Explain the types of production functions.

Ans:_____

_____

5.4 Laws of Production Function

In the preceding pages, we have studied that in the short run the output can be increased by increasing the amount of the variable factor. Therefore, the response of output to changes in the amount of a variable factor, while keeping the units of fixed factors constant, is referred to as returns to a factor. Besides this, output can be increased by increasing all the factors of production in the long run. The response of output to changes in the size or scale of all the factors is called as returns to scale. Thus, there are two laws of production:

Law of Variable Proportions or Returns to a Factor and Law of Returns to Scale.

5.4.1 Law of Variable Proportions

In economic theory, the law of variable proportion occupies an important place. This law examines the production function with one-factor variable, keeping the quantities of other factors constant.

When one factor's quantity is increased while the quantity of other factors remains unchanged, the proportion between fixed and variable factors changes. The law of variable proportions states that as the proportion of factors is changed, the total production at first increases more than proportionately, then equi-proportionately and finally less than proportionately. The classical economists named it the law of diminishing returns. It is now

usually called the law of variable proportions. It can also be called the law of diminishing marginal product or diminishing marginal returns.

G.J. Stigler, writes, *"As equal increments of one input are added; the inputs of other productive*

services being held constant, beyond a certain point the resulting increments of product will decrease, i.e., the marginal product will diminish."

According to Leftwitch, *"The law of variable proportions states that if the input of one resource is increased by equal increments per unit of time while the inputs of other resources are held constant, total output will increase, but beyond some point the resulting output increases will become smaller and smaller."*

According to Samuelson, *"An increase in some inputs relative to other fixed inputs will, in a given state of technology, causes output to increase; but after a point the extra output resulting from the same additions of extra inputs will become less and less"*.

5.4.1.1 Assumptions of the Law

The law of variable proportions holds good under the following assumptions:

1 One of the factors is variable while all other factors are fixed.

2 All units of the variable factor are homogeneous.

3 The state of technology is assumed to be given and unchanged. If change in technology will occur then AP and MP may rise instead of diminishing.

4 This law is based upon the possibility of varying the proportions in which the various factors can be combined to produce a product. For instance, 2 hectares of land with 1 labourer; or 2 hectares of land with 4 labourers. It is important to mention here that this law does not apply to those cases where the factors must be used in fixed proportions to yield a product.

5.4.1.2 Stages of Law of Variable Proportion

When a variable quantity of one factor is combined with a fixed quantity of the other, the production process can be divided into three stages, as shown in the table below.

Table 2 Three Stages of Production

Units of Land (Hectare)	Labour (No. of Workers)	Total Product (TP)	Average Product (AP = Q/L)	Marginal Product (MP = ΔQ/ΔL)	tion of Three Stages of Production
1	1	2	2	2	**Stage 1**

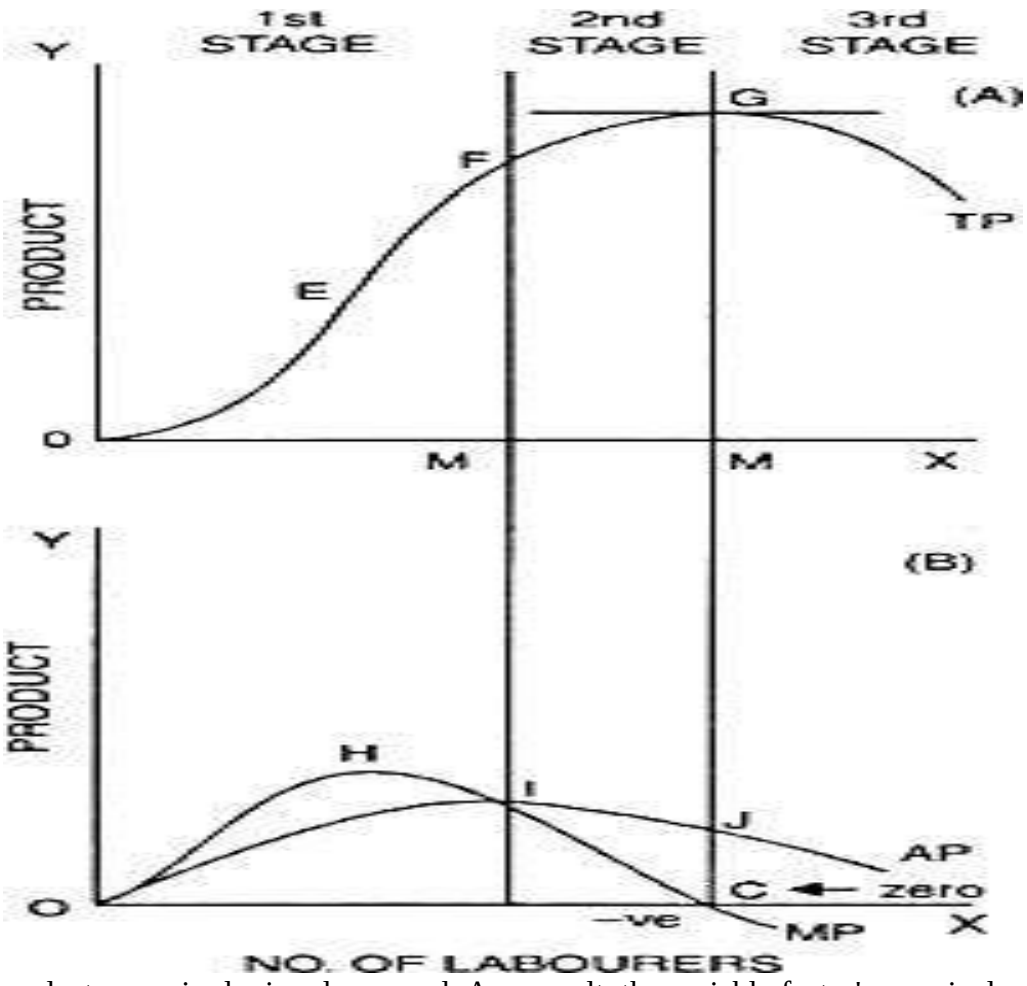
1	2	5	2.5	3	Increasing Returns to a Variable Factor
1	3	9	3	4	
1	4	12	3	3	**Stage 2** Diminishing Returns to a Variable Factor
1	5	14	2.8	2	
1	6	15	2.5	1	
1	7	15	2.1	0	**Stage 3** Negative Returns to a Variable Factor
1	8	14	1.7	-1	

It will be seen from figure 1 that the behaviour of the variable factor's total, average and marginal products in response to an increase in its amount is typically divided into three stages.

A. **Increasing Marginal Returns to a Factor (Stage 1):** Total product rises at an increasing rate to a point in this stage. During stage 1, the total product continues to rise, but its slope is decreasing, implying that from point E to G, the total product rises at a diminishing rate (the total product curve is concave downwards at this level), i.e., the marginal product falls but remains positive. The point E where the total product stops increasing at an increasing rate and starts increasing at the diminishing rate is called the point of inflection. The average product curve reaches its maximum point at the end of stage 1. It is worth noting that the marginal product in this stage initially rises and then falls, but it remains higher than the average product during stage 1, implying that the average product continues to rise.

B. **Diminishing Marginal Returns to a Factor (Stage 2)**: Total product continues to increase at a diminishing rate in this stage until it reaches its maximum point G, where the second stage ends. The variable product's AP and MP both are diminishing at this stage, but they have remained positive. The variable factor's marginal product is zero at the end of the second level, i.e. at point C.

C. **Negative Marginal Returns to a Factor (Stage 3):** Total product is declining in this stage, and



the total product curve is sloping downward. As a result, the variable factor's marginal product is negative, and the marginal product curve goes below the X-axis.

From the above figure the relationship between AP and MP can be explained.

a. AP is rising in Stage 1. MP rises at first, and then starts to fall. It's worth noting that as AP rises, MP must be greater than AP.

b. AP decreases in Stage 2. MP continues to decrease until it reaches zero at point C. MP remains below AP as long as AP is declining.

c. MP becomes negative in Stage 3. While AP continues to decline, it remains positive. It is important to remember that even if MP is negative, AP must remain positive.

The relationship between MP and TP can also be explained.

a. TP increases at an increasing rate in Stage 1 as long as MP rises. However, as MP decreases, TP increases at a decreasing rate.

b. During Stage 2, as MP begins to decline, TP rises at a diminishing rate. There is no rise in TP when MP = 0.

c. When MP is negative in Stage 3, TP begins to decline.

The Stage of Rational Decisions

A key question now is in which stage a rational producer would seek to produce. A rational producer would never try to produce in stage 3, where the variable factor's marginal product is negative. He will stop at the end of stage 2, when the variable factor's marginal product is zero. The producer will maximize the total product and thus make maximum use of the variable factor at end point C of the second stage, where the marginal product of the variable factor is zero. According to Ferguson, "Even if units of the variable input were free, a rational producer would not employ the zero marginal products because their use entails a reduction in total output."

A rational producer will not want to produce in stage 1, where the fixed factor's marginal product is negative. It means he will not make the maximum use of the fixed factor in stage 1, and he will also not completely exploit the opportunities to increase output by raising the quantity of the variable factor, whose average product will continue to grow during stage 1. As a result, a reasonable producer will not stop at stage 1, but will expand further. From the above, it is clear that a rational producer can never be found producing in stages 1 and 3. As a result, stage 1 and 3 in the production function reflect non-economic regions. Therefore, a reasonable producer will often try to produce in stage 2, where the marginal and average product of the variable factor is decreasing.

(I) <u>Causes of Increasing Marginal Returns to a Variable Factor</u>

A. Effective utilization of the Fixed Factor: In the beginning, the quantity of the fixed factor is abundant relative to the quantity of the variable factor. Therefore, when more and more units of the variable factor are added to the constant quantity of the fixed factor, then the fixed factor is more intensively and effectively utilised, that is, efficiency of the fixed factor increases as additional units of the variable factor are added to it. Due to this, initially production increases at an increasing rate. On the other side, some amount of the fixed factor remains unutilised because the variable factor is relatively smaller in quantity.

B. Increase in Efficiency of the variable factor: As more and more units of the variable factor are employed; the possibility of division of labour and specialisation increases. Thus, greater the quantity of the variable input, the greater the scope for specialisation which will further help to

increase efficiency and productivity.

C. **Better Coordination between the factors:** So long as the fixed factor remains underutilized, additional application of the variable factor tends to improve the degree of co- ordination between the fixed and variable factors. As a result, total output increases at an increasing rate.

(II) Causes of Diminishing Marginal Returns to a Factor

This is the most important stage of the law of diminishing returns. Following are the main causes for the operation of this law:

1) **Scarcity of the Fixed Factor:** When with the increase in the variable factor the fixed factor becomes more and more scarce in relation to the variable factor so that as the units of the variable factor are increased, they receive less and less aid from the fixed factor. Hence, marginal and average products of the variable factor decline.

2) **Imperfect Substitutability of the Factors:** Factors of production are imperfect substitutes of each other. More and more of labour, for example, cannot be continuously used in place of additional capital. Accordingly, diminishing returns to the factor becomes inevitable.

3) **Indivisibility of the Fixed Factor:** If the factors were perfectly divisible, there would have been no necessity of taking the large quantity of the fixed factor in the beginning to combine with the varying quantities of the other factor. A significant point worth mentioning is that if factors were completely divisible, the issue of differing factor proportions would not have arisen and thus the phenomenon of increasing and decreasing marginal returns to a factor would not have occurred.

4) **Poor Coordination between the factors**: Increasing the application of the variable factor along with the fixed factor(s) above a certain point crosses the ideal factor ratio limit. Consequently, the co-ordination between the fixed and the variable factor becomes poor.

(III) Causes of Negative Marginal Returns

The total product declines and the marginal product become negative as the amount of the variable factor is increased to the constant quantity of the fixed factor. The phenomenon of negative marginal returns to the variable factor occurs when the amount of the variable factor increases too large in relation to the fixed factor, as they get in each other's way, causing total production to fall rather than rise. In short, just as the marginal product of the fixed factor was negative due to its abundance in the first stage, the marginal product of the variable factor is negative due to its excessiveness in the third

stage.

1. General Applicability of the Law of Diminishing Returns

The law of diminishing returns, which states that marginal physical product ultimately diminishes, even though it increases at first, has been discussed previously. Until Marshall, it was assumed that three laws of production are distinct and different. Modern economists, on the other hand, believe that decreasing, constant and increasing returns are three phases of one general law i.e., law of variable proportions, rather than three different laws. Furthermore, before Marshall, it was assumed that the law of diminishing returns applied to agriculture and manufacturing industries was characterized by constant or increasing returns. However, this is no longer the case; the law of diminishing returns has a wide range of applications. This law covers industries as well as agriculture. In case of application to industries Factors of production must be increased in order to maximise the output of manufactured products. Labor and capital are more important in manufacturing industries than land and capital is usually fixed in supply during the short term. As a result, increasing the number of workers is pursued to increase productivity. When more labour is used on a fixed amount of capital, the marginal product of labour must eventually decrease. Whereas in case of application to agriculture, labor and capital can be increased to the desired extent in order to increase agricultural output since these are variable factors, but not land, which is a fixed factor of production. As a result, when rising doses of labour or capital are added to a fixed amount of land, the variable factor's marginal return starts to decrease, and the law of diminishing returns becomes operative.

Causes for the Application of this Law to Agriculture Sector:

There are various reasons due to which this law is applicable to the agriculture sector.

A. In agriculture, nature plays a significant role. Natural factors such as rainfall have a significant impact on agricultural production. However, there is a lot of concern about the supply of rainwater. As a result, the law of diminishing returns kicks in quickly.

B. With continued agriculture, land fertility continues to decline. As a result, the marginal return decreases as more units of labour or capital are added to it.

C. Agricultural activities are spread out over vast areas of land, requiring less supervision. As a result, it cannot be efficiently supervised. Consequently, the cost of production rises.

D. Agriculture is considered as a seasonal occupation. The demand for labour in the agriculture sector

is for some months only while the rest of the time they remain idle, which causes a rise in cost of production.

E. Due to the lower degree of division of labour and specialisation, agriculture experiences a faster application of the law of diminishing returns.

F. In addition to this, all pieces of land are not fertile in the same way. When demand for land rises, even less fertile land is cultivated. It translates to lower marginal returns and higher production costs.

Thus, the law of diminishing returns is considered universal since it applies to all fields of output.

5.4.1.3 **Importance of the Law of Diminishing Marginal Returns**

a. Malthus based his population theory on this law. According to him, food grain production lags behind population growth because agriculture is subject to the law of diminishing returns.This law is the foundation for Ricardo's theory of rent. The first dose of labour and capital to land yields higher returns than the second. The difference between the first and second dose's returns is referred to as 'rent.

b. This law is also considered as the basis of the theory of distribution. According to the marginal productivity theory of distribution, as more and more units of factor of production are employed its marginal productivity decreases. As a result, it's per unit share in total production decreases.

5.4.1.4 Postponement of the Law of Diminishing Marginal Returns

In the following two situations, the law of variable proportions can be postponed:

A. If technological advancements occur, the application of the law of variable proportions can be delayed. Because, with the advancement in technology the law of variable proportions becomes ineffective, resulting in increased efficiency and lower cost.

B. The operation of this law can also be postponed when the factors of production are perfect substitutes of each other.

Check Your Progress II

Q1. What is law of variable proportion?

Ans:_____

_____

Q2. Define TP and MP.

Ans:_____

_____

5.4.2 Law of Returns to Scale

Next, the scale of production in the context of two factors of production means a given amount of labour and capital is used in the production process. Thus, the proportionate change in both the factors brings about a change in the scale. The behaviour of total output when all inputs are varied by the same proportion is called returns to scale as applicable in the long run. Long run is that production function in which all the factors of production are variable. Thus, in this type of production function we try to find out the behaviour of output when it is possible to change the size of all the factors. It means we tried to explain the behaviour of output in response to changes in these scales. Any change in the scale means that all inputs or factors are changed in the same proportion. According to Koutsoyiannis, "The term returns to scale refers to the changes in output as all factors change by the same proportion."

In the long run, output can be increased by increasing all factors in the same proportion or different proportions. Ordinarily, law of returns to scale refers to increase in output as a result of increase in all factors in the same proportion. Such an increase in output is called returns to scale. In the long run output may be increased by changing all factors by the same proportion or by different proportions.

Let us start from an initial level of inputs and outputs:

$$P = f(L, K)$$

If both the factors of production, i.e., labour (L) and capital (K) are increased in the same proportion (k), then production function will be rewritten as:

$P^* = f(kL, kK)$Let us start from an initial level of inputs and outputs:

$$P = f(L, K)$$

If both the factors of production, i.e., labour (L) and capital (K) are increased in the same proportion (k), then production function will be rewritten as:

$$P^* = f(kL, kK)$$

If P*, increases in the same proportion as increase in factors of production, i.e., $\frac{P_*}{P} = m$, then we

say that there are constant returns to scale.

If P*, increases less than proportionate increase in factors of production, i.e., $\frac{P_*}{P} < m$, then we have decreasing returns to scale.

If P, increases more than proportionate increase in factors of production, i.e., $\frac{P_*}{P} > m$, we have increasing returns to scale.

Increasing Returns to Scale

Increasing returns to scale occurs when a given percentages increase in all factor inputs causes' proportionately greater increase in output. For example, if 100% increase in all factor inputs (labour and capital) causes 150% increase in output then returns to scale are called increasing. From above, it can be said that when output increases at a higher rate than the increase in factors of production employed.

Causes of Increasing Returns to Scale

There are numerous reasons due to which in the initial stage the firm is having increasing returns:

A. **Indivisibility of Factors:** Some factors are available in large and lumpy units and can therefore be utilised utmost efficiency at a large level of output. Therefore, in the case of some indivisible and lumpy factors, when output is increased from a small level to a large one, indivisible factors are better utilised and therefore increasing returns are obtained.

B. **Greater Possibilities of Specialisation of Labour and Machinery:** With the increase in the scale, returns to scale can occur because the firm can introduce greater degree of specialisation of labour and machinery and also because it can install technologically more efficient machinery.

As in the large scale of production, instead of being general, workers can specialize in performing a particular task in the production process.

Thus, it can be said that as the scale of production is increased, due to indivisibility of factors such

as labour, machines, division of labour and specialisation and many types of economies are available to the firm. On account of these economies, proportional increase in returns is more than the proportionate increase in factors of production. All these economies are only internal economies as these are related to the scale of production of the concerned firm.

(A) Constant Returns to Scale

Constant returns to scale occur when a given percentage increase in all factor inputs causes equal percentage increase in output. Therefore, if we are doubling or trebling all factors then output will also respond in the same proportion. For instance, if 100% increase in all factor inputs causes 100% increase in output, it is a case of constant returns to scale. In mathematics, the case of constant returns to scale is called as linear homogeneous production function or homogeneous production function of the first degree.

Thus, constant returns to scale occurred when total output increases at the same rate at which all the factors of production are increased. This situation arises, when after reaching a certain level of production, economies of scale are counter-balanced by diseconomies of scale. This function states that if labour and capital are increased in equal proportion then output will also increase in the same proportion. Cobb and Douglas production function is based on this scale.

1. Decreasing Returns to Scale

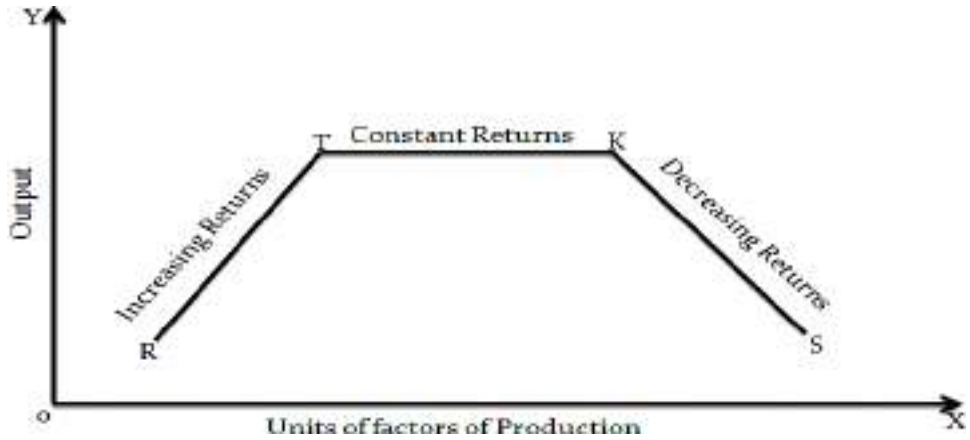
Decreasing returns to scale occurs when a given percentage increase in all factor inputs causes proportionately lesser increase in output. If 100% increase in all factor inputs causes, say, only 80% increase in output, it is a case of decreasing returns to scale. The fundamental cause for the operation of decreasing returns to scale, according to some economists, is when diseconomies surpass economies of scale. For instance, indivisible factors becoming inefficient and less productive, difficulties of control and rigidities due to large managements, higher cost of skilled labour, higher price of raw material and high transport charges. Thus, as a company grows in size, its administrative structure becomes more complex. The management is likewise unable to adapt quickly to shifting demand and cost conditions. After a certain point in the expansion of the factors, diseconomies of scale occur, resulting in decreasing returns to scale. It is important to mention here that there is a difference between decreasing returns to scale and diminishing marginal returns.

Table 3 Returns to Scale

Units of all factor inputs used	Total Returns (quintals)	Average Returns (quintals)	Marginal Returns (quintals)	Scale
One	10	10	10	Increasing
Two	22	11	12	
Three	35	11.66	13	
Four	60	15	25	Constant
Five	85	17	25	
Six	102	17	17	Decreasing
Seven	114	16.28	12	

The former arises due to the increasing complexities of the organisation, while the latter is due to the application of increasing units of a variable factor to fixed factors. Table 3 explains the law of returns to scale, when the units of all factors are increased in the same proportion, the total output responds at different rates i.e., increasing, constant and decreasing.

The returns to scale can be explained with the help of a figure. It will be seen from figure 2 that when the units of factors of production are increased, the output increases at a higher scale initially.



As more and more units are put into the production process the marginal product becomes constant because the percentage increase in output is equal to the percentage increase in inputs. If we increase further the units of inputs the output will start declining**.** In this figure, the product curve

shows increasing returns from R to T, constant returns from T to K and diminishing returns from K to S.

Figure 2

From the above discussion, it is clear that when the units of all the factors are increased in the same proportion, total output increases at the different rates i.e., increasing, constant and decreasing.

Check Your Progress -III

Q.1 What is the law of returns to scale? Explain the different stages of this law.

Ans:_____

_____

Q2. Which is the rational stage of production and why?

Ans._____

_____

5.5 Summary

In this unit, we discussed that the production function describes a physical relationship which must be combined with prices of inputs to determine the efficient resource combination of producing a specific level of output. There are two types of input-output relations or production functions. Firstly, the production function when the quantities of some inputs are kept constant and the quantity of one input are varied which is called the law of variable proportion. Secondly, the input-output relation by varying all inputs proportionally is called as returns to scale. Since in the long run all factors can be varied, thus law of returns to scale relates to long-run production function. The way resources are combined in a production process, the productivity of resources in various combinations and the prices of the resources involved in the production process all have a major role in determining the cost of production of a commodity. Thus, production is the most important activity taking place in an economy because the decisions about what to produce and how to produce are important to any economic system.

5.6 Questions for Practice

A. Short Answer Type Questions

Q1. What is the production function?

Q2. Distinguish between fixed and variable factors of production?

Q3. Mention the assumptions of law of variable proportion.

Q4. Explain the law of increasing returns to a factor.

Q5. What do you understand about the law of returns to scale?

Q6. Define long run production function.

Q7. Define TP, AP and MP.

Q8. Distinguish between fixed and variable factors of production.

Q9. Mention the three stages of production.

Q10. Will a producer ever stop in stage 1st and 3rd of production?

Q11. Which is the rational stage of production?

Q12. What are diminishing returns and increasing returns to scale?

B. Long Answer Type Questions

Q1. Explain the law of variable proportions. Explain various stages of this law with the help of a table and a diagram.

Q2. State and explain the law of variable proportions. How does it differ from the law of returns to scale?

Q3. Explain and illustrate the three stages of production with the help of law of variable proportions. In which stage a rational producer would like to operate?

Q4. Explain and illustrate the law of diminishing returns. Why does this law operate?

Does it apply to agriculture only?

Q5. Explain the circumstances under which the increasing returns to a factor operate.

Is it always applicable to industry?

Q6. What do you understand by returns to scale? Explain the three types of returns to scale.

5.7 Suggested Readings

- L. Ahuja, Principles of Microeconomics, S. Chand & Company Ltd. New Delhi

- D.N. Diwedi, Microeconomics, Theory and Application, Vikas Publishing House, New Delhi.
- Perloff, J. M, Microeconomics, Theory and Application with Calculus, Pearson Addison Wesley.
- Koutsoyiannis, A, Modern Microeconomics, The Macmillan Press Ltd.

BACHELOR OF ARTS

SEMESTER I

COURSE: MICRO ECONOMICS

UNIT 6: CONCEPTS OF COST AND REVENUE

STRUCTURE

6.0 Learning Objectives

At the end of this unit, the learner will be able to:

- Determine the meaning of fixed and variable costs.
- Know the concept of short-run cost curves under a traditional theory of cost
- Define the concept of long-run cost curves under the traditional theory of cost.
- Describe the short run and long run cost curves under modern theory.
- Learn about the concepts and shapes of revenue curves
- Describe the relationship between AR, MR and TR
- Elaborate the difference between the shapes of AR and MR curves under perfect competition, monopoly and monopolistic competition

6.1 Introduction

Production is one of the important activities of any economy. There are four factors of production

i.e., land, labour, capital and entrepreneurship. Production is mainly the transformation of inputs into output. When these factors are used for production purposes, some remuneration is given to these factors for their services, and payment is cost for the production unit. The payment made to the use of inputs is called the cost. The importance of costs cannot be ignored especially in the modern world. Costs are one of the important factors that determine the size and quality of the product. The costs affect both the supply and demand in a society. The cost of production to price advises a firm to produce or not to produce and determines the level of production or service to be provided to the customers.

Every producer, after producing a product is interested to sell his product in the market. The revenue of a firm, together with its cost, determines profit. In this chapter, we study the concept of revenue. The term 'revenue' refers to the receipt obtained by a firm from the sale of certain quantities of a commodity at various prices. There are three main types of revenue i.e., total revenue, average revenue and marginal revenue. The revenue is required for determination of price. Without revenue profit cannot be found out. Even in market forms equilibrium can be found out with the help of revenue.

6.2 Types of Costs

Cost of production is the most important force governing the supply of a product. It should be pointed out here that for each level of output, the firm chooses least cost combination of factors. Various concepts of costs as are used in modern economic theory are explained below and then we turn to study the derivation of short-run and long-run cost curves.

There are different types of costs used in price theory, these are money costs, explicit costs, implicit costs, real costs, opportunity costs, private and social costs etc.

1) **Money Cost:** It is the money outlays of a firm on the processes of production of its output. A producer considers only the money costs of procuring the inputs necessary for products. These are the payment made to buy raw material, rent, wages and salaries paid to its labour, buying and repairing of machinery, payment for electricity, fuel, transportation, insurance and tax payment etc. Money cost is the production cost expressed in monetary terms.

2) **Explicit Cost:** These refer to all those expenses made by firm to buy goods directly. These include purchase of raw material, depreciation charges, fuel, electricity bills, transportation

cost etc. so directly made to the agents. These are also called accounting costs.

3) **Implicit Cost:** These refer to implied or unnoticed costs. Implicit costs are the costs of self -owned or self -employed resources. These include rent on his own land, interest paid on his own capital and salary to his own labour. The accounting costs or the contractual cash payment, which the firm makes to other factor owned for purchasing or hiring the various factors are also known as explicit costs. The money rewards for other factors the entrepreneur himself owns and employs in the firm are known as implicit cost. The economists take into consideration both the explicit and implicit cost.

   Economic cost = Accounting costs + Implicit costs

   =Explicit cost + Implicit costs

4) **Real Cost:** The producer calculates his private cost of production only and he does not include those costs which are borne by the society is called real cost. A mill owner will count his money cost only and ignore the sufferings or sacrifices of the people living nearby, who have to pay in the form of increased medical bills due to smoke coming out of chimneys or water waste coming out of the mill.

5) **Opportunity Costs:** The concept of opportunity cost occupies a very important place in modern economic analysis. The opportunity cost of any commodity is the next best alternative that is sacrificed.

Prof. Benham defines the opportunity cost as, "The opportunity cost of anything is the next best alternative that could be produced instead by the same factors or by an equivalent group of factors, costing the same amount of money."

The concept of opportunity cost bears two important points first, the opportunity cost of anything is only the next best alternative foregone. Thus, opportunity cost producing a good is not any other alternative good that could be produced with the same factors, it is only the most valuable other good, which the same factors could produce Second point worth noting is all the factors used in the production of one thing may not be the same as are required for the production of next best alternative good.

Therefore, the opportunity cost of a good should be viewed as the next-best alternative good that could be produced with the 'same value' of the factors which are more or less the same. It is the

cost of production of any unit of commodity for the value of factors of production used in producing another unit. These are also known as the alternative costs or transfer costs. With the given resources in a factory washing machines and refrigerators can be produced, only washing machines are produced worth two lakhs so opportunity cost of refrigerators is two lakh rupees.

6) **Private and Social Costs:** There are certain costs which arise due to the function of the firm but do not normally figure in business decisions nor are such costs explicitly paid by the firms. Certain such costs are paid by the society. Thus, the total cost generated by the firm's decision may be divided into two categories.

a) Those paid out or provided by the firms and are known as 'private costs', Those not paid by the firms including use of resources freely available plus the disutility created in the process of production and are known as 'Social costs'

Private costs are those which are actually incurred or provided for by an individual or a firm on the purchase of goods and services from the market. For a firm, all the actual costs, both explicit and implicit, are private costs. Private costs are internalised in the sense that 'the firm must compensate the resources owned in order to acquire the right to use the resource.' It is only the internalised cost that is incorporated in firm's total cost to production.

Social cost, on the other hand, implies the cost which society bears on account of production of a commodity. Social cost includes both 'private cost' and 'external cost'. External cost includes (a) the cost of 'resources for which the firm is not compelled to pay a price', e.g., atmosphere, rivers, lakes and also for the use of public utility services like roadways, drainage system etc. and (b) the cost in the form of disutility created through air, water and noise pollution's etc. The cost of expenditure incurred to safeguard the individual and public against various kinds of health hazards created by production system and thus, is used in the estimation of social costs.

Check Your Progress- I

Q1. Differentiate between Explicit and Implicit costs.

Ans._____

_____

Q2. What is opportunity cost?

Ans._____

6.3 Theories of Cost

Now, we will explain the shape of cost curves in short run and long run with the help of traditional and modern theories of costs.

6.3.1 Traditional Theory of Cost

There are some factors which can be readily adjusted with the changes in output level. These factors may be labour, raw material etc. On the other hand, there are some factors such as capital equipment, buildings etc. which can't be so readily varied. It requires a comparatively longer time to make variations in them. The factors such as raw materials, labour etc., which can be readily varied with the change in the level are known as variable factors and the factor such as capital equipment and buildings which cannot be so readily varied are called fixed factors.

Corresponding to this distinction between variable factor and fixed factors, economists distinguish between short run and long run. The short run is a period of time in which output can be increased or decreased by changing only the amount of variable factors such as labour, raw material etc. In the short run, quantities of the fixed factors such as capital equipment, factory building etc. cannot be varied, i.e. the quantities of fixed factors remain unaltered.

On the other hand, the long run is defined as the period of time in which the quantities of all factors may be varied, all factors being variable in the long run.

In the short run, almost all the factors of production are fixed in quantity and the total fixed costs (TFC) include the expenditures of the firm per unit of time for all the fixed inputs. Similarly, the total variable costs (TVC) is the total expenditure incurred by the firm per unit of time for all variable inputs. Total cost equals total fixed cost plus total variable cost. Some other concepts of costs include explicit costs and implicit costs. Explicit cost includes the value of actual inputs used by the firm to produce the product. The value inputs owned by the firm should be estimated from what they could earn in their best alternative use.

6.3.1.1 Fixed Costs and Variable Costs

Fixed costs are those costs which are independent of output, that is they do not change with changes in output. These costs are a 'fixed' amount which must be incurred by a firm in the short run whether the output is large or small. Even if the firm closes for some time in the short run,

these costs have to be borne by it. Fixed costs are also known ‘as overhead costs’ and include charges such as contractual rent, insurance fee, maintenance costs, interest on capital invested, property taxes minimum administrative expenses etc. Thus, fixed costs are those which are incurred in hiring the fixed factors of production whose amount cannot be altered in the short run.

Variable costs, on the other hand are those costs, which are incurred on the employment of variable factors of production, and their amount can be altered in the short run when output rises or falls. If the firm shuts down for some time in the short run, it will not use variable factors and will not, therefore, incur any variable costs. Variable costs are also called ‘prime costs’ or ‘direct costs.’ The sum of total fixed cost and total variable costs is called the total cost of production. The total fixed cost curve is horizontal straight line to the OX axis which shows that whatever the quantity of output the same i.e. constant. The total variable cost curve is sloping upward rising from zero output initially gradually and later at a fast speed. Besides

this, the total cost of the vertical addition of total fixed cost (TFC) and total variable cost (TVC). Since the TFC is constant the difference between TC and TFC will always continue to be the same.

Total cost of business is the sum of its total variable costs and total fixed costs.

TC	= TFC+TVC
Where TC	= Total costs
TFC	= Total fixed costs
TVC	= Total variable costs

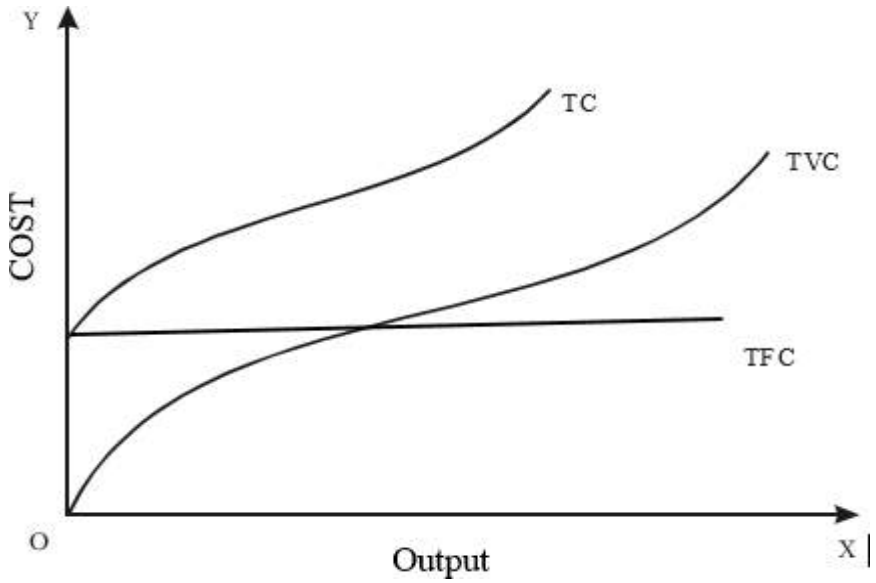


Figure 1

One or more factors of production are fixed quantity in the short run. Total fixed cost (TFC), total variable cost (TVC) and total cost (TC) have been shown in fig. no. 1

Since the total fixed cost remains constant whatever the level of output, the total fixed cost curve is parallel to the X-axis. It is seen in the fig. 1 that total fixed cost curve starts from a point on the Y-axis meaning thereby that total fixed cost will be incurred even if output is zero. On the other hand, the total variable cost curve (TVC) rises upward showing thereby that as the output is increased, the total variable costs also increases. The total variable cost curve TVC starts from the origin which shows that when output is zero, the variable costs are also nil. It is also noted that TC is a function of the total output.

TC = f (Q)

Total cost curve (TC) has been obtained by adding up vertically total fixed cost and total variable cost curve. Therefore, vertical distance between TVC and TC is constant throughout.

The total cost curve (TC) is exactly the same as that of the total cost (TVC) because the same vertical distance always separates the two cost curves.

6.3.1.2 Short-Run Average Cost Curve

The short run is a period of time in which output can be increased or decreased by changing only the amount of variable factors such as labour, raw material etc. In the short run, quantities of the fixed factors such as capital equipment, factory building etc. cannot be varied,

i.e. the quantities of fixed factors remain unaltered.

The concept of average costs is more frequently used term in economic theory. Average cost is total cost divided by the number of units of total output produced.

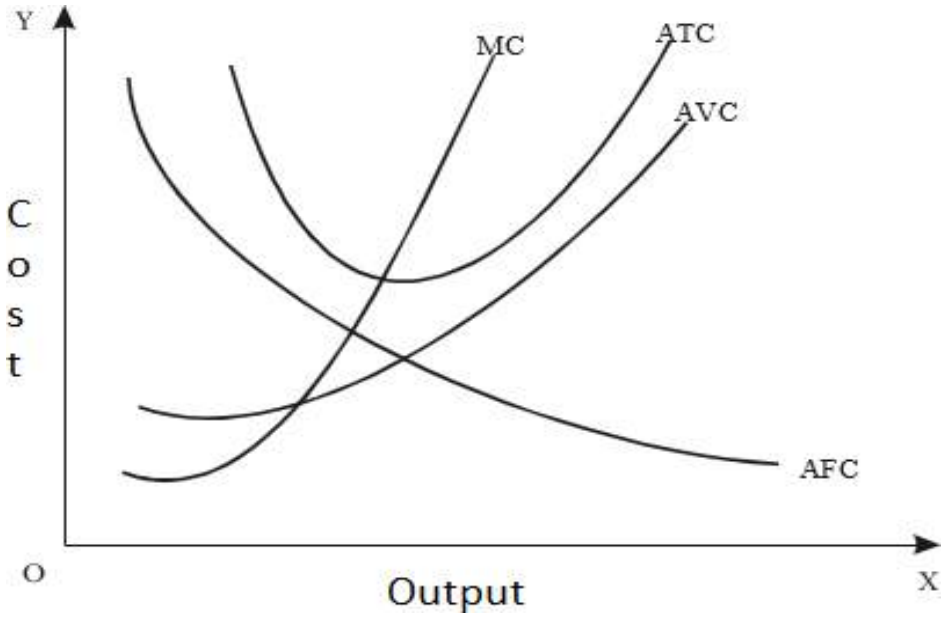
$$AC = TC/TQ$$

A. Average Fixed Cost (AFC)

Average fixed cost is the total fixed cost divided by the number of units of total output produced. Therefore,

AFC = TFC/TQ

Where TQ is total output produced. It is seen from the figure 2 that the average fixed cost



continuously falls throughout.

Figure 2

The average fixed cost curve possesses another property; if we pick up any point on the (AFC) curve and multiply it with the corresponding quantity of output produced, the product will be same because total fixed cost remains constant throughout.

B. Average Variable Costs (AVC)

Average variable cost is the total variable cost divided by the number of units of output produced. Therefore

AVC = TVC/TQ

Thus, average variable cost is variable cost per unit of output. The average variable cost will generally fall as the output increases from zero to the normal capacity output due to the occurrence of increasing returns. But beyond the normal capacity output the average variable cost will rise steeply because of the operation of diminishing returns.

Average Total Cost ATC or AC

Average total cost of what is simply known as average cost is the total cost divided by the number

of units of output produced.

Average cost = Total Cost/Output

$$AC = TC/TQ$$

Since the total cost is the sum of total variable cost and total fixed cost, the average total cost is also the sum of average variable cost and average fixed cost.

$$TC = TVC + TFC \quad AC = AVC + AFC$$

The shape of average total cost will depend on average fixed cost and the average variable cost. We find in the Fig. 2 that in the beginning, both AVC and AFC curves fall, the ATC curve, therefore, falls sharply in the beginning. When AVC begins rising, but AFC curve is falling steeply, the ATC curve continues to fall. But as output increases further, there is a sharp rise in AVC which more than offsets the fall in AFC. Therefore, the ATC curve rises after a point. Therefore, the average cost curve (ACC) like the AVC curve first falls, reaches its minimum value and then rises. Average cost curve is therefore almost of a 'U' shape.

6.3.1.3 Short Run Marginal Cost Curve

The concept of marginal cost occupies an important place in economic theory. Marginal cost is 'addition' to the total cost caused by producing one more unit of output. In other words, marginal cost is the addition to total cost of producing n units instead of n-1 units where n is a given number.

$$MC = TC - TC_{n-1}$$

Since marginal cost is a change in total cost as a result of change in output, it can also be written as:

$$MC = \frac{\Delta TC}{\Delta TQ}$$

Where ΔTC is a change in Total cost and ΔTQ is a small change in output.

MC is independent of fixed cost. Since fixed costs do not change with output, there are no marginal fixed costs when output increases.

$MC_n = TC_n - TC_{n-1}$ $TC = TVC + TFC$

$$= TVC_n + TFC - TVC^{n-1} - TFC$$

$$=TVC_n - TVC_{n-1}$$

Marginal cost is independent of fixed cost and, thus, can be directly attributed to change in variable cost

$$MC=\frac{\Delta TVC}{\Delta TQ}$$

6.3.1.4 elation Between Average and Marginal Cost Curves

The relationship between the marginal cost and average cost is same as that between any other marginal average quantities. It can be illustrated with the help of following example shown in table no. 1.

Table 1**:** Relationship Between Average and Marginal Cost

Units of Output	**Fixed Cost (Rs.)**	**Variable Cost (Rs.)**	**Total Cost (Rs.)**	**Average Cost (Rs.)**	**Marginal Cost (Rs.)**
1	42	60	102	102	
2	42	110	152	76	50
3	42	150	192	64	40
4	42	210	252	63	60
5	42	310	352	70.4	100
6	42	540	552	97	230

The relationship between average and marginal cost can be shown with the help of fig. 3 when marginal cost is above average cost, the average cost rises but when marginal cost is below the average cost, average cost falls. When marginal cost stands equal to the average cost, the average cost remains constant. The minimum point of marginal cost curve comes prior to the minimum point of average cost curve.

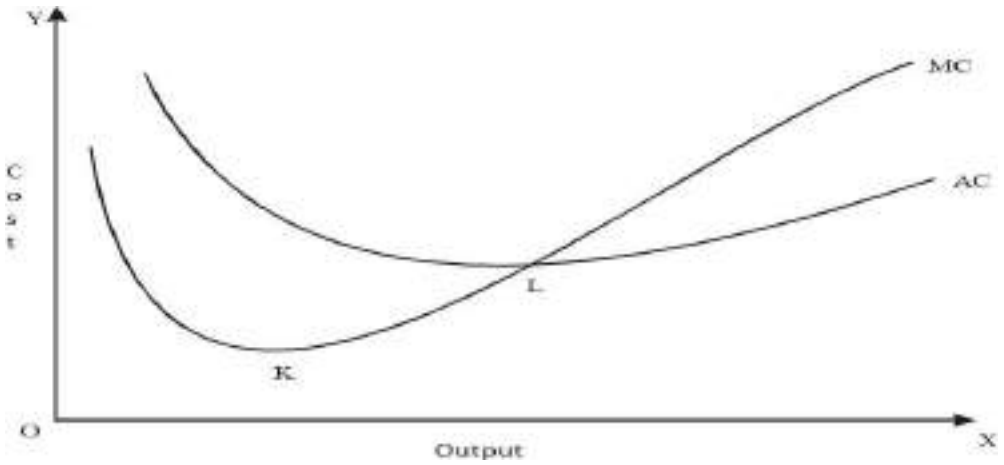


Figure 3: Relationship between Marginal Cost and Average Cost Curves

It is not necessary that when average cost curve is falling, marginal cost curve will also be falling what can be said definitely is that, when average cost curve is falling, marginal cost curve will be below the average cost curve.

Average Cost (AC) Curve U-shaped

Basically (AC) average cost curve gets its shape because of the operation of the law of variable proportions. In the beginning, the proportion of fixed factors is relatively large as these are under-utilised in the beginning. Therefore, AC will fall with increase in the amount of variable factors. When the proportion between fixed and variable factors is most desirable, AC touches its minimum. Later on, proportion of variable factors becomes relatively larger and, therefore, AC swings upward. In other words, we know that AC is the addition of AFC and AVC. In the beginning both AFC and AVC fall with increase in output, therefore, AC should decline as more is produced. AC does not necessarily go up as AVC begins to rise because during this period fall in AFC may be greater than rise in AVC only when increase in AVC is more than a decrease in AFC, that AC will move up. Thus, AC has a minimum point at a large output while AVC records a minimum at a lower output. The availability of internal economies and diseconomies also offer an explanation to the U-shape of average cost curve. It is because of due to the application of the law of the diminishing returns (or increasing costs) that the AVC curve rises. That is why it becomes U shaped.

Check Your Progress-II

Q1. Explain short run cost curves.

Ans:_____

_____

Q2. Why is Average Cost (AC) Curve U-shaped?

Ans:_____

_____

6.3.1.5 Long-run Average Cost Curve

All factor inputs are assumed to be freely variable in the long period. There is a view represented by economists like Knight, John Robinson and Kaldor that if all factors are freely variable and the commodity is perfectly divisible, a large firm has no advantage over a small firm under perfect competition. For this view inputs all economies and diseconomies in production to the existence of indivisible factors and assumes that there are no independent economies or diseconomies of scale. The scale of a firm is increased accordingly as it increases all of its factors inputs together in the same proportion so that the proportion in which they are combined remains the same. Naturally, then the long period cost curves of the firm (LAC and LMC) will be horizontal as shown in Fig. 4 below:

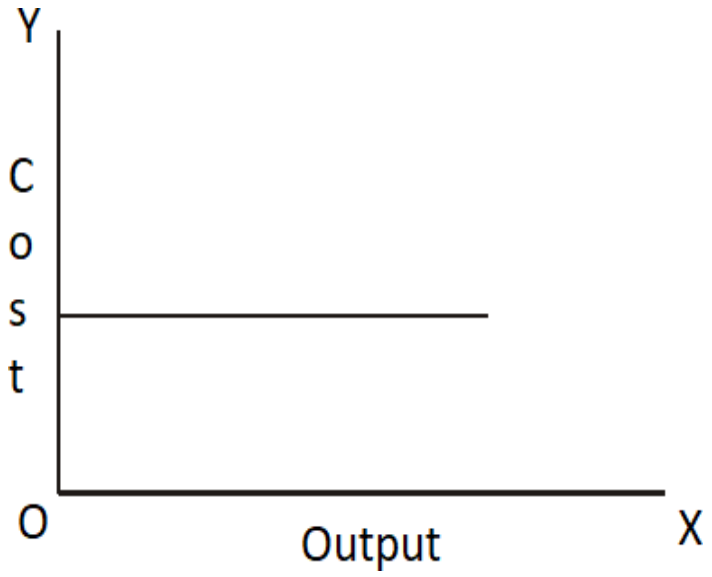


Figure 4

But there is an opposite view represented by Chamberlin, according to whom there are independent economies as well as diseconomies of scale. If we agree with this view, the long

period cost curves will also be U-shaped as shown in Fig. 5 below

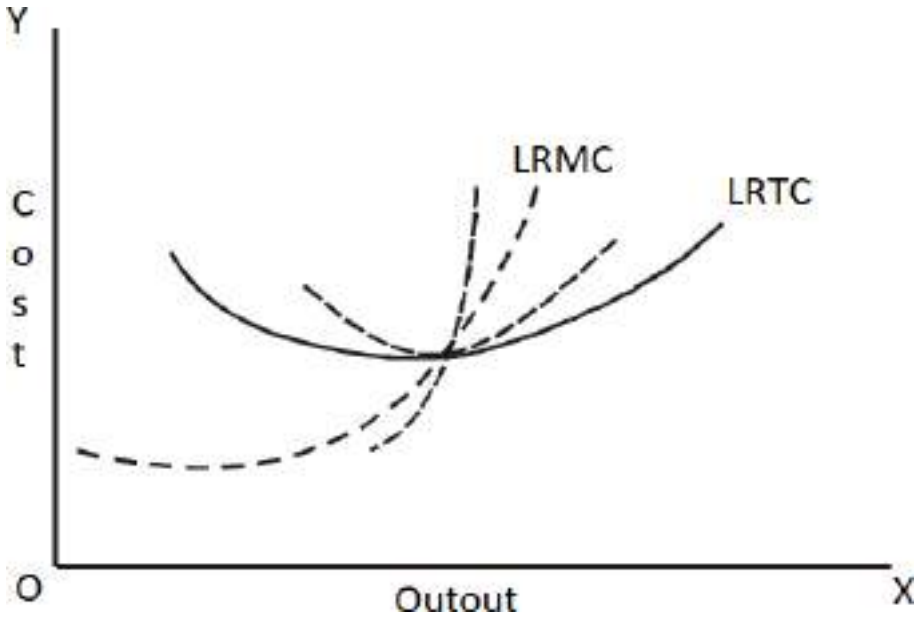


Figure 5

However, they will be flatter than the short-period cost curves for the obvious reason that in the long period it is possible to adjust the factor proportion adequately and thus to reduce the rate at which total cost tends to change in the firms's output.

In the long run, none of the factors is fixed and all can be varied to expand production and, therefore, the firm has no fixed costs in the long run. A long run cost curve depicts the functional relationship between output and long run cost of production. Long run average cost curve depicts the possible average cost of producing all possible level of output.

In order to understand the derivation of long run average cost curve, we consider the three short run average cost curves as shown in the figure 6. These short run average cost curves are also known as plant curves. In the short run, the firm can be operating on any short run average cost curve, given the size of the plant. It is seen that upto OB amount of output, the firm will operate on the short run average cost curve SAC_1 though it could also produce with short run.

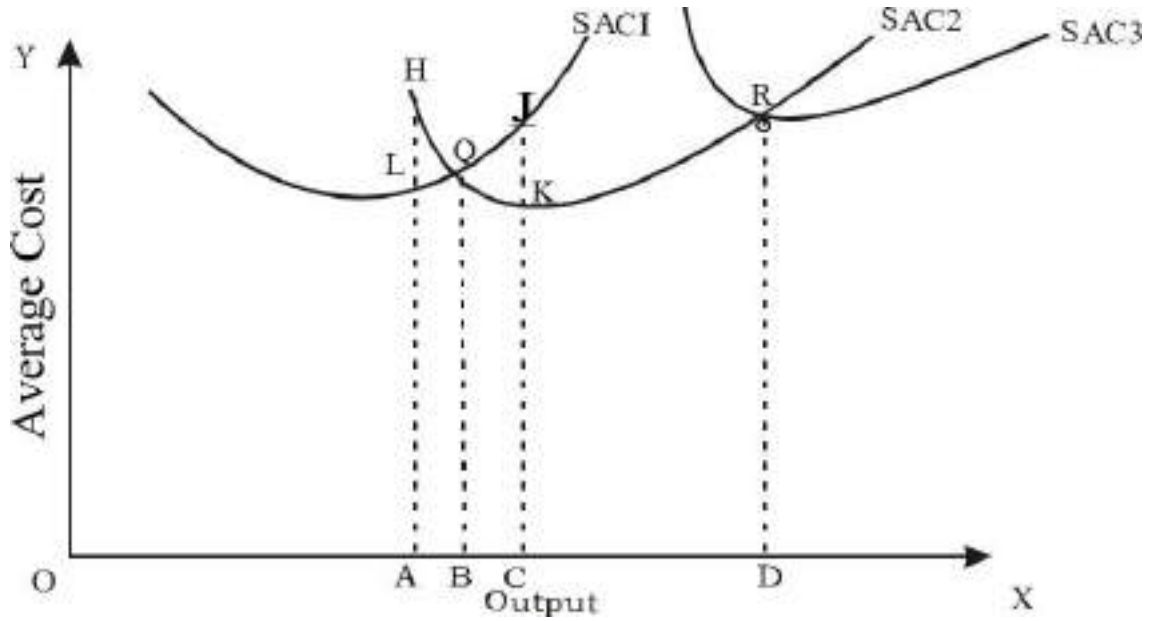


Figure 6

It is seen that upto OB amount of output, the firm will operate on the short run average cost curve SAC_1 though it could also produce with short run average cost curve SAC_2 because upto OB amount of output production on SAC_1 curve entails lower cost than on SAC_2. For instance, if the level of output OA is produced with SAC_1 it will cost AL per unit and if it is produced with SAC_2, it will cost AH per unit. It is clear from the figure that AL is smaller than AH. Similarly, all other output levels upto OB can be produced more economically with the smaller plant SAC_1 than with the larger plant SAC_2. It is thus clear that in the long run the firm will produce an output which is larger than OB (but less than OD), than it will be economical to produce on SAC_1. It will be seen from the figure that the output is larger than OB but less than OD, can be produced at a lower cost per unit on SAC_2 than on SAC_1. Thus, the output OC if produced on SAC_2 costs CK per unit which is lower than. CJ which is the cost incurred when produced on SAC_1.

Therefore, if the firm plans to produce between outputs OB and OD, it will employ the plant corresponding to short-run average cost curve SAC_2. If the firm has to produce an output which exceeds OD, then the cost per unit will be lower on corresponding to the short-run average cost curve SAC_3 than on SAC_2.

It is, thus, clear that in the long run the firm has a choice in the employment of a plant, and it will employ the plant which yields possible minimum unit cost for producing a given output. The long run average cost curve depicts the least possible average cost for producing various levels of output when all factors including the size of the plant have been adjusted.

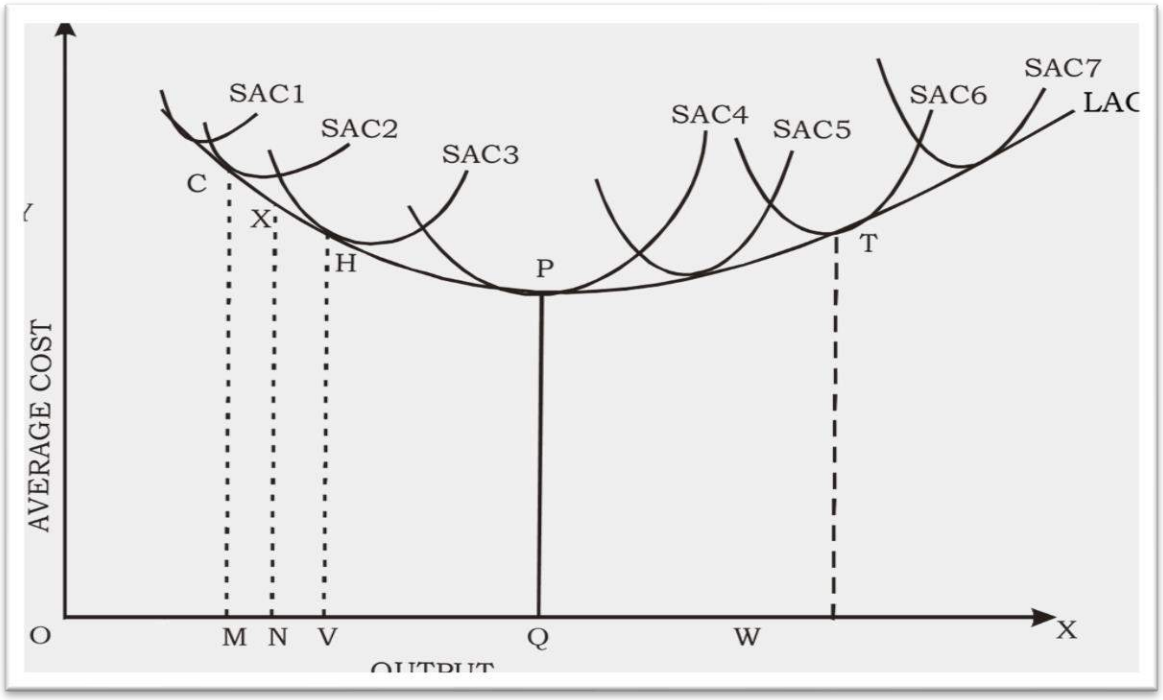


Figure 7: Long Run Average Cost Curves

Suppose now that the number of alternative plants that the firm can have are very large. Then instead of having a wide area for each short period AC, now the LAC will have one point from each SAC, the point of tangency LAC and the relevant SAC. The LAC then envelops the SACs hence it is known as the 'envelop curve'. As Leftwich writes 'the point of tangency is taken to minimum cost for any given output, the firm should use the scale of plant whose short run average cost curve is tangent to the long-run average cost at that output.

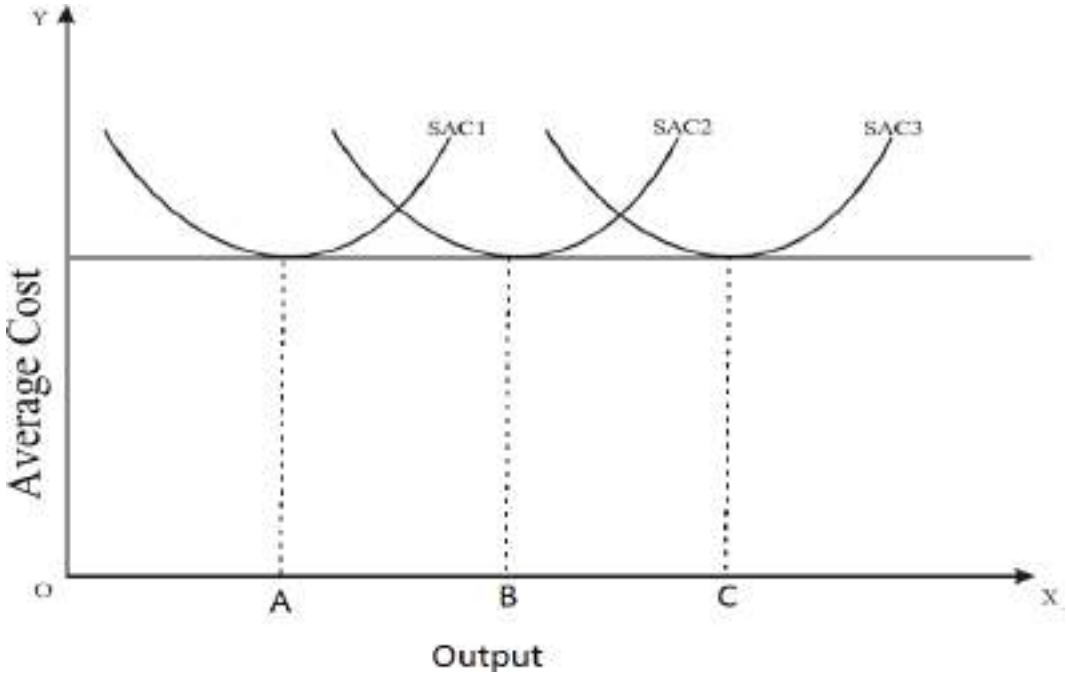
The LAC is tangent to only the lowest SAC at the minimum point of the latter. In case of all those plants which come earlier the point of tangency is prior to the minimum point of SAC, indicating that a bigger plant reduces cost. But in the case of plants coming after the lower SAC, the points of tangency are to the right of the minimum of SACs implying that over utilisation of a

smaller plant reduces cost rather than the construction of a bigger plant. Thus LAC is the locus of all those points which represent minima of cost of production for various output levels. LAC is also called envelope curve.

Long- Run Average Cost Curve in Constant Cost Case

If the production function is linear and homogeneous and also the prices of inputs remain constant, then the long run average cost will remain constant at all levels of output as depicted in fig. 8

Figure 8: Long Run Average Cost Curve



It will be noticed that all the short run average cost curves such as SAC_1, SAC_2 and SAC_3 have the same minimum average cost of production. This means that whatever the size of the plant, the minimum average cost of production is the same. This implies that all factors can be adjusted in the long run in such a way that the proportion between them always remains optimum.

6.3.1.6 Long-run Marginal Cost Curve

The long run marginal cost curve can be directly derived from the long run total cost curve, sine the long-run marginal cost at a level of output is given by the slope of the total cost curve at the point corresponding to that level of output.

In the figure 9 long run marginal average cost curve which is U-shaped. It is noticeable that

long run marginal cost (LMC) curve is flatter than the short-run marginal cost curves.

The relationship between long run marginal cost curve and long run average cost curve is the same as that between short-run average and short-run marginal cost curve. It is also seen that at the level of output at which a particular SAC curve is tangent to the LAC curve the corresponding SMC curve intersects the LMC curve. In other words, at the level of output where the short-run average cost is equal to the long run cost, the corresponding short-run marginal cost is equal to long run marginal cost too.

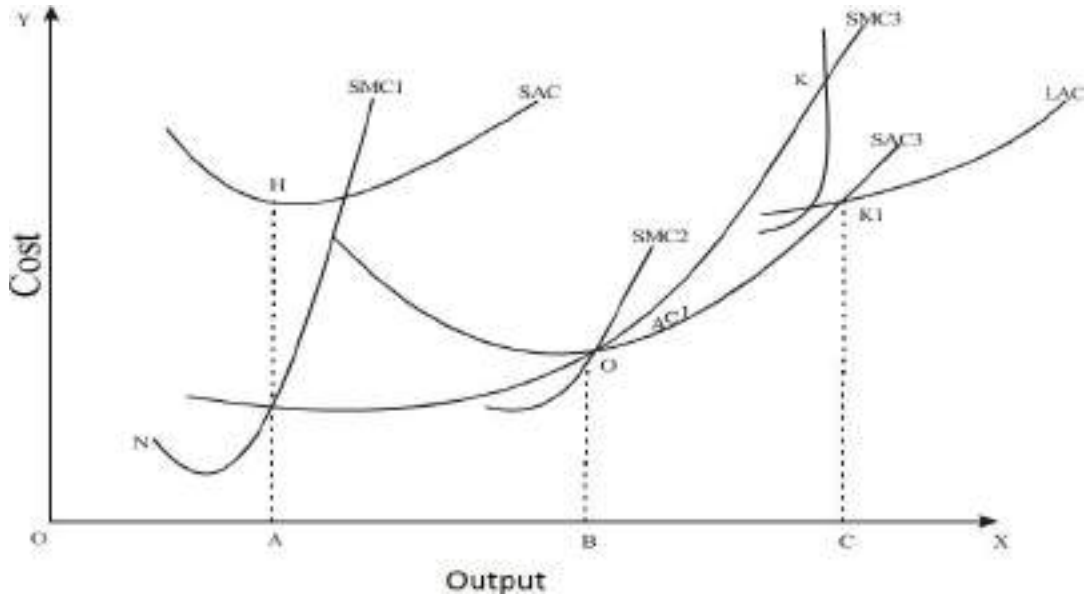


Figure 9 Long Run Marginal Cost Curve

Check Your Progress-III

Q1. Why long run cost curve is called envelope curve?

Ans:_____

_____

Q2. Explain the long run cost curves in Traditional theory of costs?

Ans:_____

_____

6.3.2 Modern Theory of Cost

The traditional theory of cost has been criticised by a number of scholars and and they have given new theories of costs. The writers of this new approach were mainly G. Stigler, Sargent Florence,

C.A. Smith, K.J. Arrow etc., It was in 1939 that G. Stigler advanced the idea that average variable cost in the short-run has a flat stretch over a period of time. It is also called saucer-shaped short run average variable cost (SAVC). It is also argued that this flatness is mainly due to the fact that firm helps some provision for additional productive capacity which is known as the 'reserve capacity' to increase the output in the context of abrupt demand of its product.

6.3.2.1 Short run Average Cost Curves

- Average Fixed Cost
- Average Variable cost
- Average Total Cost

A. Average Fixed Cost Curve: Some changes have been introduced regarding the average fixed cost (AFC). Basically, this cost comprises of the cost of physical and personal organisation of the firm i.e., the following one;

a) The salaries of staff employed directly in production and paid on a fixed term basis.

b) The wear and tear of machinery.

c) The salaries and expenditures of administrative staff.

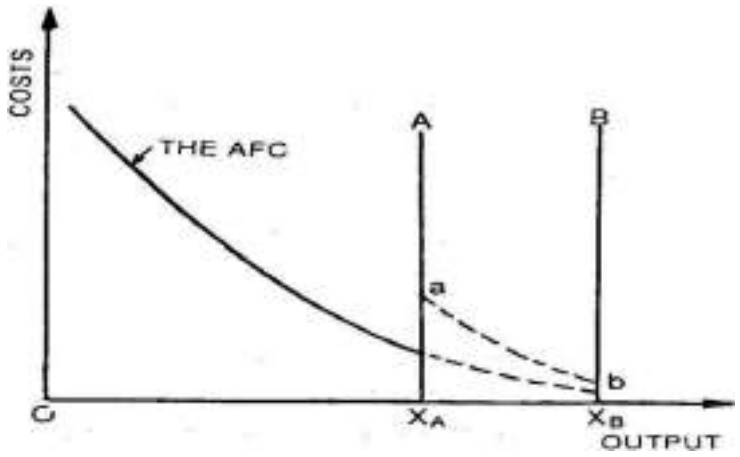
d) The costs on maintenance/repair of buildings.

e) Expenses on the maintenance of land.

The importance of AFC is that it mainly determines the size of the plant. The entrepreneur would like to plan the level of output that he can produce efficiently and flexibly. Moreover such a plant will have the capacity more than the 'expected average' level of sales. It is because of the businessman prefers to have some 'reserve capacity' due to some reasons. Actually, he

wants to meet seasonal and cyclical fluctuations in his demand. Secondly, the reserve capacity would provide more freedom to increase his output in case of abrupt increase in demand for his product. Thirdly, the reserve capacity is required to have time for repairs without affecting the running of the plant continuously. At fourth place, some kind of technology needs reserve capacity because it is very difficult to install and operate time and again. Even at the organisational and administrative level some reserve capacity is needed for employing the administrative staff to allow some increase in the production operations of the firm.

The figure 10 shows that the firm has some largest-capacity units of machinery which causes setting an absolute limit B in case of short run increase in output. Besides, the firm has small unit machinery which limit expansion of output to boundary (A) given in the diagram. But this is not an absolute boundary as the firm can expand its output in the short-run to absolute limit B. This can be done either by paying overtime to direct labour for working longer hours. In this context AFC is depicted by dotted line in the figure or this limit can be increased by purchasing some additional small units types of machinery. In this context AFC curve shifts upwards but starts declining again.



B. **Average Variable Cost Curve**

Figure 10

In the modern theories of cost, P.W.S. Androw's theory come to be one of the most recognised theories regarding average variable cost. In his theory cost consists of (i) raw materials (ii) direct labour that changes with output and (iii) running costs of machinery.

In the short run, average variable cost is almost like U shaped but having a flat stretch over reasonable range of production as is shown in the figure 6. This flat stretch shows that the SAVC coincides with MC which remains per unit of output. Whereas to the left of this range

of stretch MC remains below SAVC but on the right side MC remains above the SAVC. The declining portion of the SAVC indicates fall in costs because of better utilisation of the fixed factors. It is mainly because of this both skills and productivity increase of variable factor i.e. labour. This better skill further reduces the cost of production by making the proper use of raw materials etc.

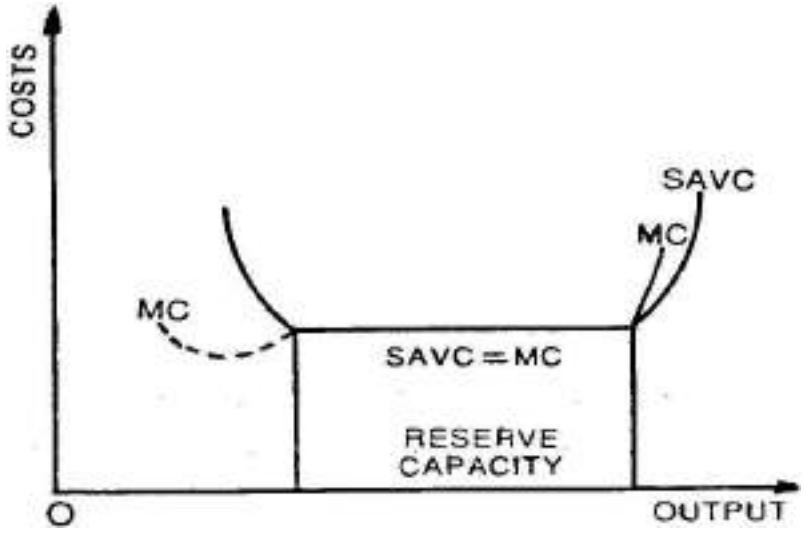


Figure 11

But the rising part of the SAVC indicates the declining productivity of labour due to frequent breakdown of machinery because of its over rise, the increasing cost of labour due to overtime payments, etc. The importance of SAVC with having a certain as flat portion that represents a reserve capacity of the firm necessary for fulfilling the urgent demand of its product. The reserve capacity has been shown in figure 12

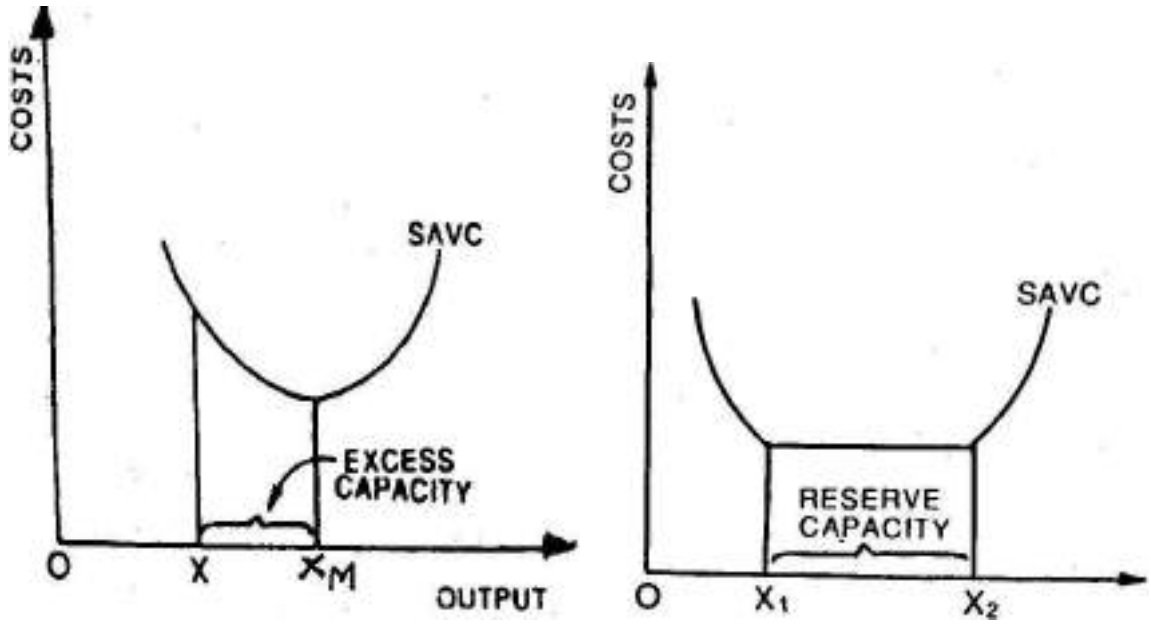


Figure 12

But it is different from the excess capacity that increases with the U shaped cost curves as given in the traditional theory of firms. This traditional theory in a way takes the assumption that each plant is designed without any flexibility. It is designed in such a way that optimal production take place only in a single level of output (x_m in the figure 12). If a firm produces output x which is smaller than x_m $x_1$there is excess capacity i.e. equal to the difference between x-x_1. This excess capacity is considered undesirable as it leads to higher units costs.

In the modern theory of costs, the range of output x_1x_2 as shown in figure 12 reflects the planned reserve capacity which does not lead to increase in costs. The firm anticipates using its plant sometimes closer to x_1 and other closer to x_2. Usually on an average an entrepreneur wants to operate his plant within the range of x_1 x_2. It is said that generally firms consider the 'normal' level of utilization of the plant which may be somewhere between two-third and three-quarters of their capacity. It has been shown at a point closer to X_2 and X_1.

C. Average Total Cost Curve

In the modern theory, it becomes desirable to know the shape of the average total cost curve especially when the variable cost curve has a saucer type shape. This has been depicted in figure no. 13

6.3.2.2 Short run Marginal Cost Curve

The ATC curve continues to decline up to certain level of output (X_A) and at this point the reserve capacity ends. At this level of output the MC intersects the average total cost curve at its minimum level. This takes place to the right of the level of output X_A, where the flat portion of SAVC comes to its end.

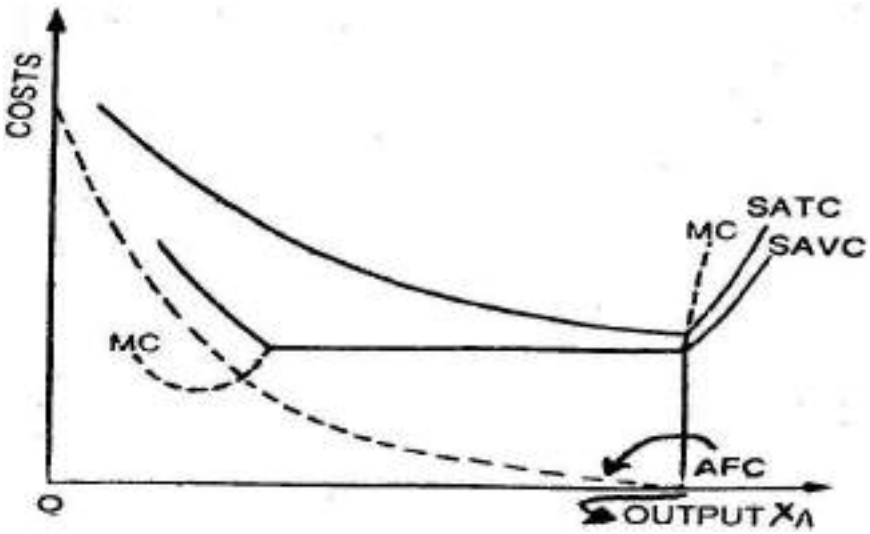


Figure 13

6.3.2.3 Long Run Average Costs Curve (L-Shaped Cost Curve)

In the long-run all costs are considered variable costs and these costs make the long-run cost L-shaped. These costs have been further divided into production costs and managerial costs. At the large scale of production, managerial costs may increase but on the other hand, the production costs decline more than the increase in managerial costs. It is due to this fact that the total LAC curve declines with the increase in scale.

Production costs decline steeply in the beginning and then gradually. As the scale of production increases, the L-shape of the production cost curve is described by the technical economies of the large-scale production. If the large firms introduce new techniques, they must be cheaper to operate. Anyhow, even with the existing known technology some economies can always be achieved at the larger output. It may be because of further decentralisation, skill improvement, secondly, less repair costs as firm reaches a certain size, and thirdly a multiproduct firm may well undertake itself in the production of some of the material or equipment, which it requires rather buying from other firm's managerial costs. There exists various level of management each with its appropriate kind of management techniques. There are small scale and large-scale organisational techniques, having different techniques of management that fall up to certain plant size but at very large scale of production managerial costs may rise but at a very slow rate.

In brief, production cost falls smoothly at large scales but managerial cost may rise at a slow rate at very large scale.

Today, modern scholars seem to accept the decline in technical costs more than that of the probable rise of managerial costs, that is why the LRAC curve falls smoothly or remains constant at a very large-scale output. LAC may be drawn implying that each short period SRAC which includes production costs, administrative costs, other fixed costs and an allowance for normal profit. LAC curve may be drawn by joining the points on the SATC curve corresponding to the two thirds of the full capacity of every plant size. This has been shown in figure 14

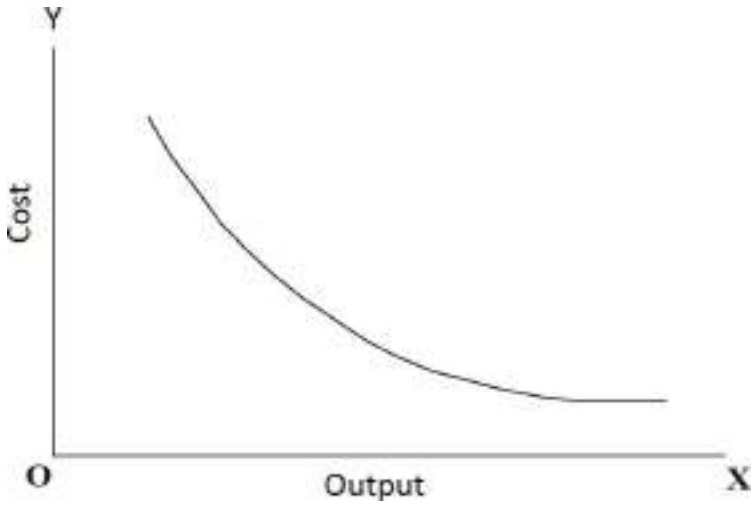


Figure. 14

6.3.2.4 Long Run Marginal Cost Curve

If LAC declines continuously the LMC will be below the LAC at all scales as have been shown in figure 15.

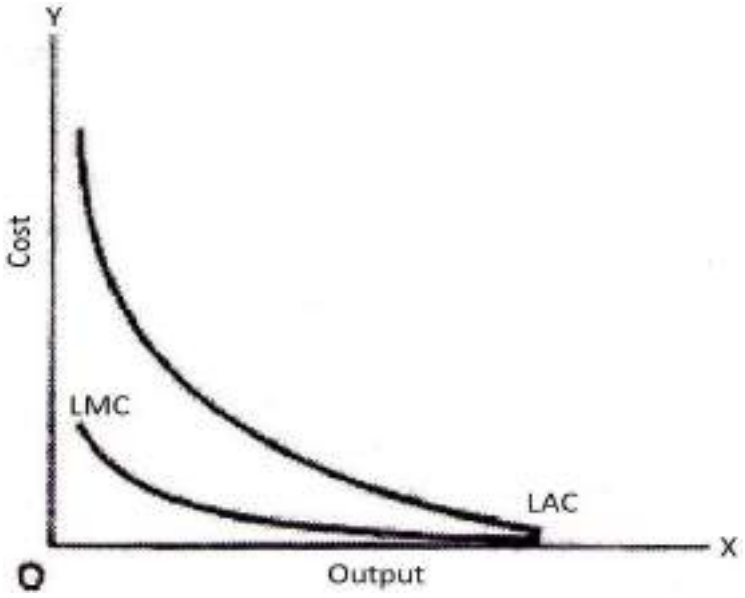


Figure 15

There is a minimum optimal scale of plant (in figure 15) at which all possible scales of economies are enjoyed, but beyond those scales the LAC remains constant. Here the LMC lies below the LAC until the minimum optimal scale is been achieved and coincides with the LAC beyond that level of output as shown in figure 16.

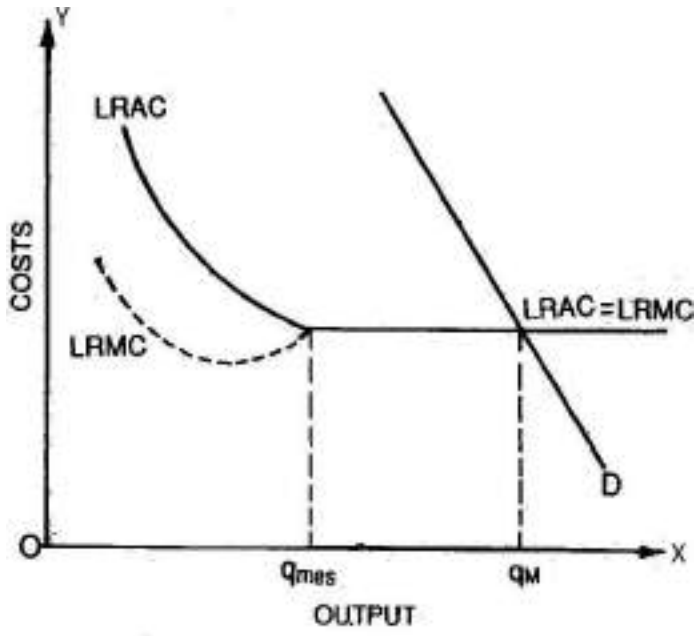


Figure 16

The above shapes of costs are more realistic than the traditional theory using U shaped cost curves.

Check Your Progress-IV

Q1. Explain average variable cost of short run of modern theory of cost?

Ans._____

_____

Q2. What do you mean by average total cost of short run?

Ans._____

_____

Q3. Explain long run cost curves.

Ans._____

6.4 Revenue Concepts

The three basic revenue concepts are: Total Revenue, Average Revenue and Marginal Revenue.

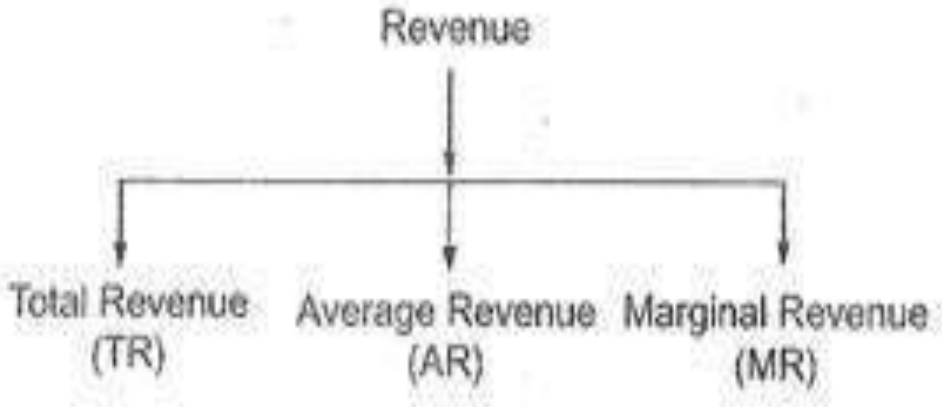


Figure 1

6.41 Total Revenue (TR)

Total revenue is the amount of income received by the firm from the sale of its products. It is obtained by multiplying the price of the commodity by the number of units sold. The income which a firm receives after selling its output in the market is known as total revenue.

Total Revenue = Price x quantity sold

$$TR = P \times Q$$

where,TR denotes Total Revenue, P denotes Price and Q denotes Quantity sold.

For example, a calculator company sold 100 calculators at the price ofRs. 500 each. TR isRs. 50,000. (TR= 500 × 100 = 50,000).

Table 1: Total Revenue at Constant Price

Quantity sold (Q)	Price (P)	Total Revenue (TR)
1	5	5
2	5	10
3	5	15

4	5	20
5	5	25
6	5	30

When price is constant, the behaviour of TR is shown in table 1, assuming P=5. When P = 5;

TR = PQ and TR=5x1=5

When price is declining with increase in quantity sold. (eg. Imperfect Competition on the goods market) the behaviour of TR is shown in table 2 and figure 2.

Table 2: Total Revenue when Price is Declining

Quantity sold (Q)	Price (P)	Total Revenue (TR)
1	10	10
2	9	18
3	8	24
4	7	28
5	6	30
6	5	30
7	4	28
8	3	24
9	2	18
10	1	10

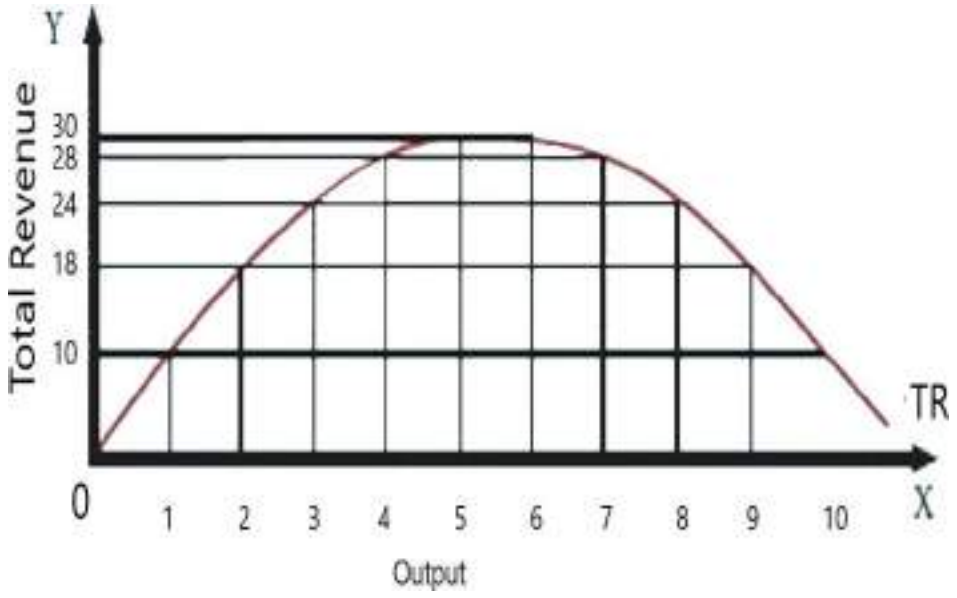


Figure 2

TR = PQ

When P =1, Q=10, TR=1 × 10 = 10 When P = 3, Q = 8, TR = 24

When P = 10, Q = 1, TR = 10

6.4.2 Average Revenue (AR)

Average Revenue is the revenue per unit of output sold,found by dividing total revenue by the number of units sold. In the words of Prof. Liebhafsky, "Average revenue is defined as total revenue divided by the number of units sold. Average revenue is, thus, merely another term meaning price of the product."

Average Revenue (AR) =Total Revenue/No. of units sold

Average revenue is the revenue per unit of the commodity sold. It is calculated by dividing the Total Revenue(TR) by the number of units sold (Q)

AR = TR /Q; if TR = PQ,

AR = PQ/Q = P

AR denotes Average Revenue; TR denotes Total Revenue and Q denotes Quantity of unit sold.

For example, if the Total Revenue from the sale of 5 units is Rs 30, the Average Revenue is (AR= 30/5 =6)

It is to be noted that AR is equal to Price.

AR=TR/Q = PQ/Q=P

In other words, average revenue means price. As the consumer's demand curve illustrates the relationship between price and quantity demanded, it also represents the average revenue or the price at which various units of the commodity are being sold, since price paid by a buyer constitutes the revenue from the seller's point of view. One man's expenditure is other person's income.

6.4.3 Marginal Revenue (MR)

Marginal revenue is an addition made to the total revenue by the sale of an additional unit of the

same commodity. In the words of MC Connel, “Marginal revenue is the addition to total revenue which results from the sale of one more unit of output.” Marginal revenue can be expressed as

MR	=	$TR_n - TR_{n-1}$
Here, MR	=	Marginal Revenue
TR_n	=	Total Revenue of n Units
TR_{n-1}	=	Total Revenue of (n –1) Units

To illustrate the concept of marginal revenue, it by sale of 10 units total revenue (TR) equals Rs. 1000 and by the sale of 11 units, total revenue (TRn-1) increases to Rs. 1100,

then marginal revenue is Rs. 100 (being the difference between Rs. 1100 and Rs. 1000).

6.5 Relationship between AR and MR

If a firm is able to sell additional units at the same price, then AR and MR will be constant and equal. If the firm is able to sell additional units only by reducing the price, then both AR and MR will fall and be different.

A. Constant AR and MR (at constant Price)

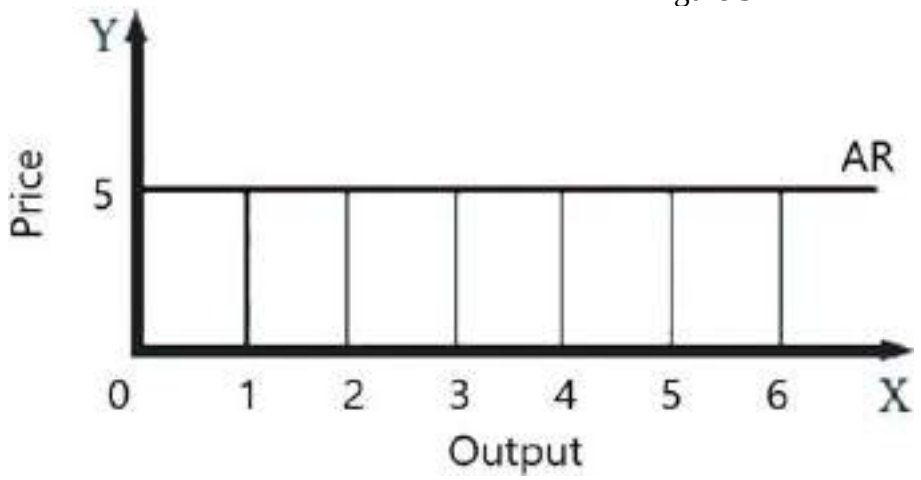
When price remains constant or fixed, the MR will be also constant and will coincide with AR. Under perfect competition as the price is uniform and fixed, AR is equal to MR and their shape will be a straight line horizontal to X-axis. The AR and MR Schedule under constant price is given in Table 3 and in the figure 3.

Table 3: TR, AR, MR at Constant Price

Quantity sold (Q)	Price (P)	Total Revenue (TR)	Average Revenue (AR)	Marginal Revenue (MR)
1	5	5	5	5
2	5	10	5	5
3	5	15	5	5
4	5	20	5	5
5	5	25	5	5

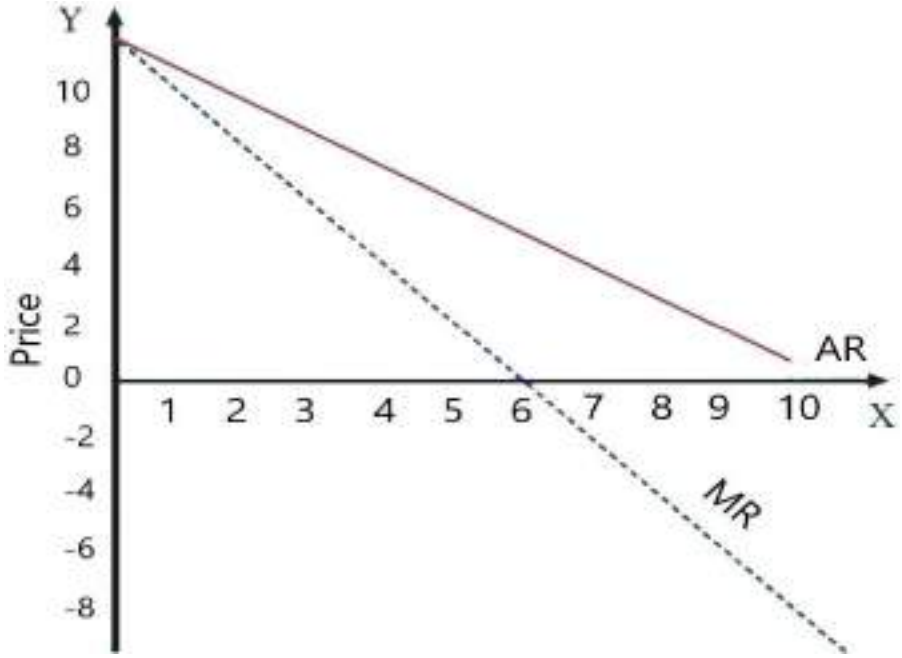
6	5	30	5	5

Figure 3



B. Declining AR and MR (at Declining Price)

When a firm sells large quantities at lower prices both AR and MR will fall but the fall in MR will be more steeper than the fall in the AR.It is to be noted intable 4 and fig. 4 that MR will be lower than AR. Both AR and MR will be sloping downwards straight from left to right. The MR curve divides the distance between AR Curve and Y axis into two equal parts. The decline in AR need



not be a straight line or linear. If the prices are

declining with the increase in quantity sold, the AR can be non-linear, taking a shape of concave or convex to the origin.

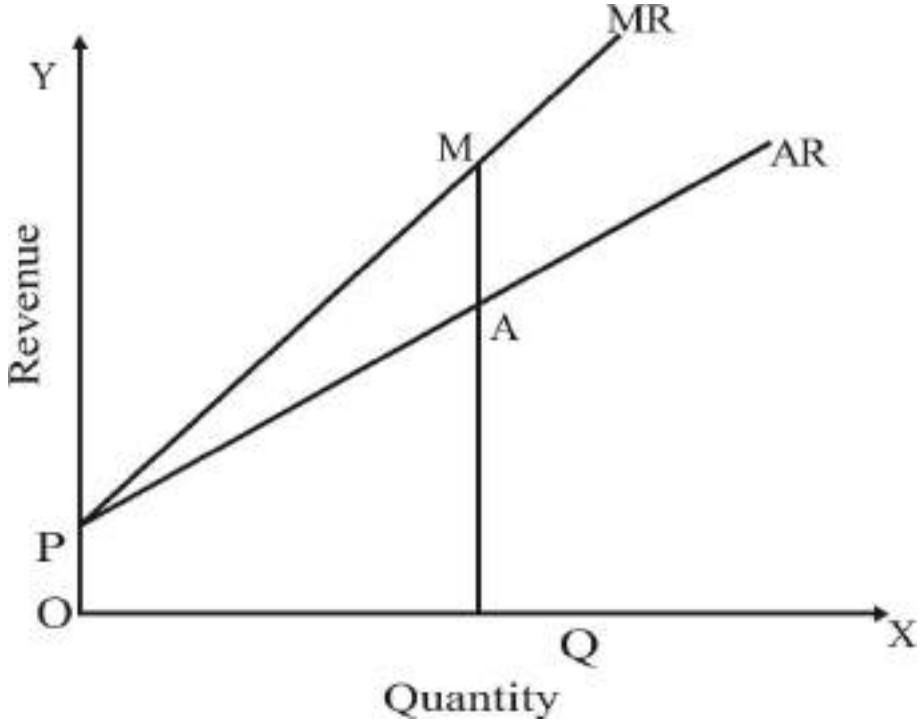
Figure 4

Table 4: AR, TR, MR at declining price

Quantity sold (Q)	Price (P)/ Average Revenue (AR)	Total Revenue (TR)	Marginal Revenue (MR)
1	10	10	-
2	9	18	8
3	8	24	6
4	7	28	4
5	6	30	2
6	5	30	0
7	4	28	-2
8	3	24	-4
9	2	18	-6
10	1	10	-8

Relationship between AR and MR can be explained as:

a) If AR Curve is rising upward from Left to Right: Then MR curve will also rise upward. This means that MR will be greater than AR. And the revenue curves drawn will show that MR curve



is above AR curve (Fig. 5)

Figure 5

In the above figure, we find that AR and MR starts from the same point P. AR rises upwards from left to right. The MR curve also rises upward and MR curve is above AR curve. It shows

a. MQ > AQ

b. Or MR > AQ

b. If AR Curve is a Straight-Line Downward Sloping: Then MR curve will pass through middle of any perpendicular drawn to the Y-axis.

c. If AR Curve is Convex to the Origin: It means, as more and more of commodities are sold, convexity of the AR shows that AR falls but at a slower rate. In case of MR, the curve will be again convex to the origin. The convexity of the curve shows that MR falls but at a slower speed. When we compare convex AR with convex MR, MR will be falling faster than AR and MR will be below AR.

d. If AR Curve is Concave to the Origin: In that case MR is also concave to the origin. AR curve is concave to the origin, when the curve is sloping downward from left to right,

means that AR is falling at a higher rate for additional units, the MR curve will also fall at a higher rate for additional units.

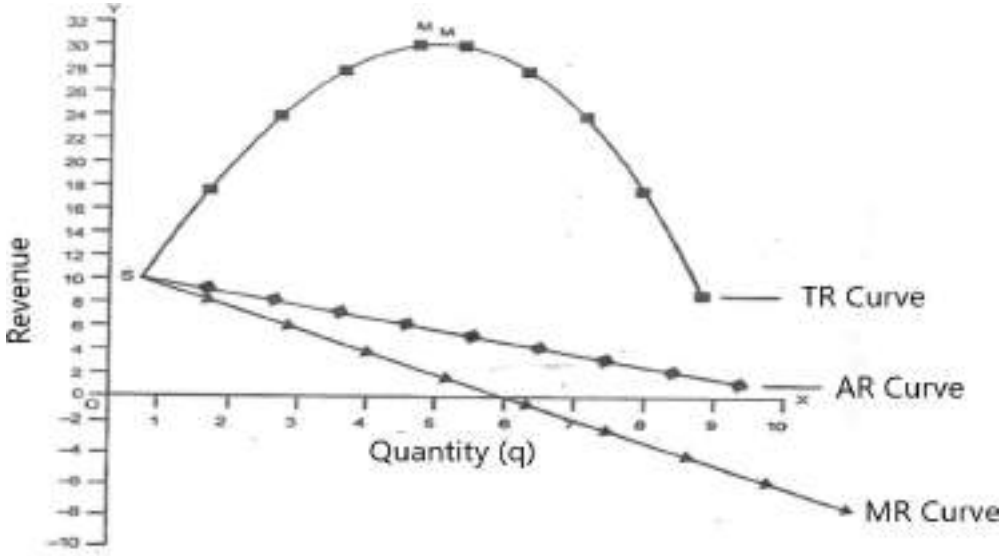
6.6 Relationship between AR, MR and TR

To understand the relationship between AR and MR, let us understand these concepts with the help of a table 5 and figure6.

Table 5: Relationship between AR, MR and TR

ts Sold (q)	AR(P) (TR/q)	TR (Pq)	MR (TRn – TRn–1)
1	10	10	10
2	9	18	8
3	8	24	6
4	7	28	4

5	6	30	2
6	5	30	0
7	4	28	– 2
8	3	24	– 4
9	2	18	– 6
10	1	10	– 8



he table shows that as price falls from Rs. 10 to Rs. 1, the output sold increases from 1 to 10. TR increase from 10 to 30, then remains 30 and ultimately falls from 30 to 10. We find that when AR falls, MR falls more than that, i.e., from Rs. 10 to 0 and then becomes negative. TR increases initially at a diminishing rate, it reaches maximum and then starts falling.

Figure 6

The Fig. 1 shows that TR curves starts from S. It is known as initial total revenue.

The TR rises from S to M. At M, TR is maximum. After that, it falls. Thus, TR rises, reaches maximum and then falls. In the same figure, AR and MR start from point S. AR falls, MR also falls but MR is much below AR. MR falls, reaches zero and then it becomes negative. AR falls but remains positive throughout. When average revenue functions are linear (straight lines), the rate of fall of marginal revenue is double the rate of fall of average revenue.

When marginal revenue is positive, total revenue rises, when MR is zero the total revenue becomes maximum. When marginal revenue becomes negative total revenue starts falling. When AR and

MR both are falling, then MR falls at a faster rate than AR.

6.7 Relationship between AR, MR, TR and Elasticity of Demand

The relationship among AR, MR and elasticity of demand (e) is stated as follows.

$$MR = AR\ (e-1/e)$$

The relationship between the AR curve and MR curve depends upon the elasticity of AR curve (AR = DD = Price).

a. When price elasticity of demand is greater than one, MR is positive and TR is increasing.

b. When price elasticity of demand is less than one, MR is negative and TR is decreasing.

c. When price elasticity of demand is equal to one, MR is equal to zero and TR is maximum and constant.

It is to be noted that, at the output range of 1 to 5 units, the price elasticity of demand is greater than one according to total outlay method. Hence, TR is increasing and MR is positive (Table 6, Fig 7).

At the output range of 5 to 6 units, the price elasticity of demand is equal to one. Hence, TR is maximum and MR equals to zero.

At the output range of 6 units to 10 units, the price elasticity of demand is less than unity. Hence, TR is decreasing and MR is negative.

Table 6: TR, AR, MR and Elasticity

Quantity (Q)	Price (P)	TR	AR	MR	Elasticity
0	11	0	11	-	e > 1
1	10	10	10	10	
2	9	18	9	8	
3	8	24	8	6	
4	7	28	7	4	

5	6	30	6	2	
6	5	30	5	0	e = 1
7	4	28	4	-2	e < 1
8	3	24	3	-4	
9	2	18	2	-6	
10	1	10	1	-8	
11	0	0	0	-10	

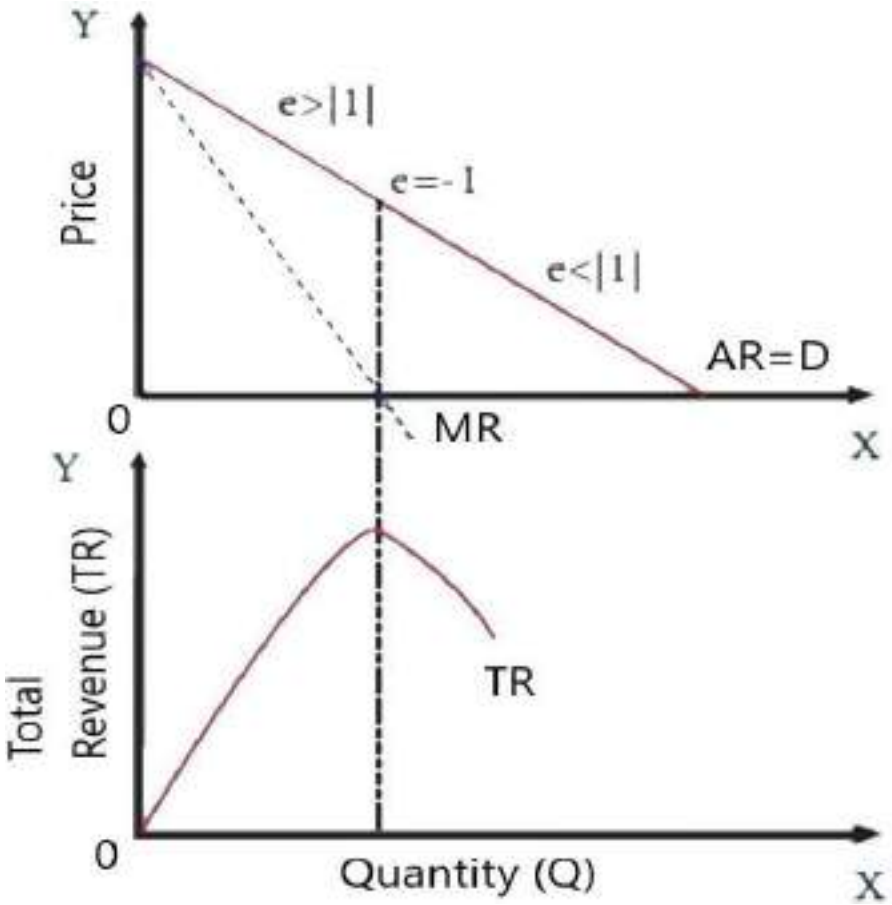


Figure 7

The exception occurs under conditions of perfect competition wherein demand is perfectly elastic because the coefficient of elasticity in infinitely large and the term to be subtracted is infinitely small and may be taken as zero.

Through the application of this formula, it can be seen that MR is always positive at any point where elasticity of AR or demand curve is greater than unity and MR is always negative where elasticity of the AR curve or the demand curve is less than unity.

From this relationship, we can maintain that MR equals price minus the ratio of price to elasticity of demand. It is evident from this relationship that MR is always less than price, with one exception, because it is calculated by subtracting some value, represented by P/E from price.

Check Your Progress-I

Q1. Define AR and MR?

Ans:_____

_____

Q2. Explain the terms between AR and TR.

Ans:_____

_____

6.8 Revenue Curves

Now we will discuss shape of the revenue curves and their relationship in different market forms.

6.8.1 Revenue Curves Under Perfect Competition

Under perfect competition or a Perfectly competitive market, the firm is a price taker. It cannot change the market price as it has to sell its products at the price prevailing in the market. If a firm tries to sell its products at a price above the market price, it can lose its customers in the market. It is because there would be other firms in the market which sell the same products at the price prevailing in the market or at a lower price than the firm's price.

Therefore, under perfect competition, the firm has to accept the price prevailing in the market-determined by market forces such as demand and supply. Hence, it means that the average revenue or the price would remain constant for the firm. Furthermore, constant AR implies constant MR. Thus, it means that under perfect competition, AR=MR=Price.

If AR is constant, MR will also be constant. In this case AR and MR will be equal. It happens under perfect competition where AR curve and MR curve of the firm will coincide. The curves

drawn will be horizontal i.e., parallel to X-axis. Now, we can show with the help of following table 7 and fig8. As we increase output, price or AR remains the same, i.e. Rs. 10. TR increases but at a constant rate.

MR is also constant i.e., Rs. 10 and it is equal to AR.

Table 7: Relationship between TR, AR and MR

Units Sold	Price (AR)	TR	MR
1	10	10	10
2	10	20	10
3	10	30	10
4	10	40	10
5	10	50	10

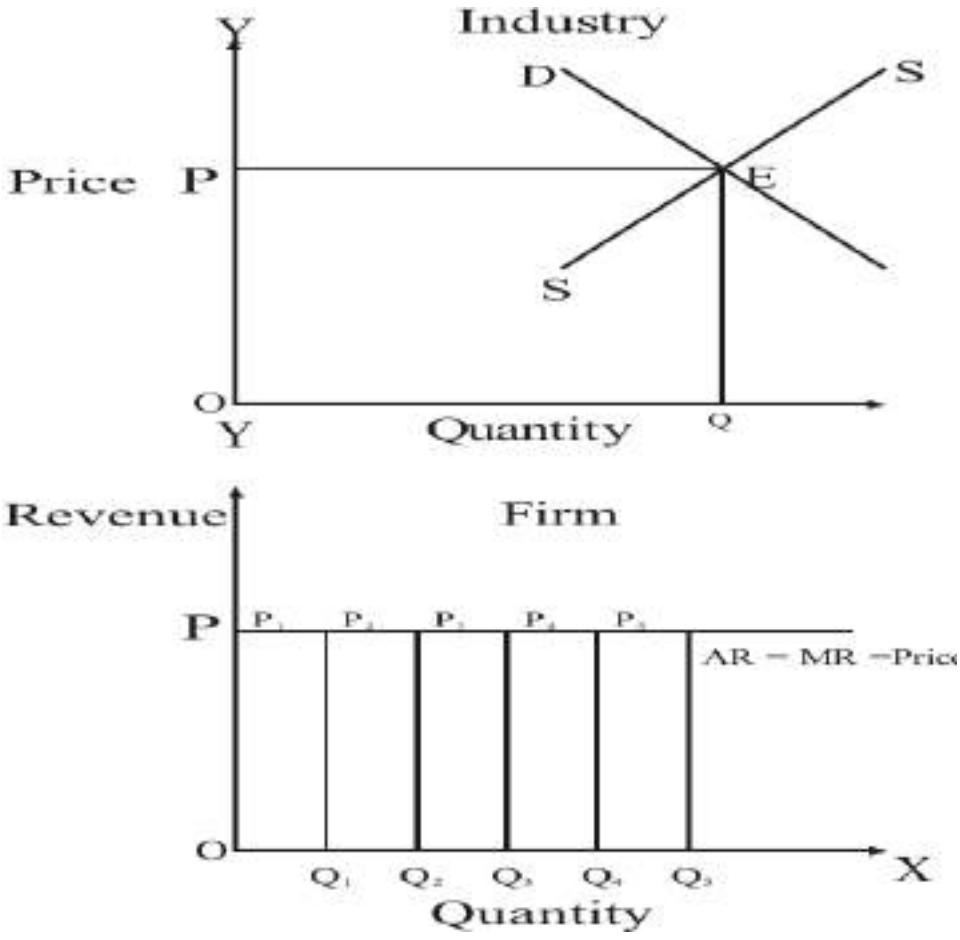


Figure 8

In fig, X-axis shows the output sold and the Y-axis shows the revenue. As shown in Fig. at price, OP, the seller can sell any amount of the commodity. In this case the AR curve is the horizontal line. The MR curve coincides with the AR. It is so because additional units are sold at the same price as before. In that case AR= MR. A noteworthy point is that OP price is determined by Demand and Supply of industry and the firm only follow.

Here, the horizontal straight line indicates the firm's revenue curve(price line or demand curve). It implies that at Rs.10 per unit, the seller or firm can sell any quantity of output. Therefore, the firm's AR curve is perfectly elastic under perfect competition.

6.8.2 Behaviour of AR and MR under Imperfect Competition

If AR falls, MR also and MR falls faster than the AR. In that case MR is below AR. The downward slopping of AR and MR curves is actually found in case of a firm. It can be shown with the help of a table 8 and fig 9.

Table 8: Relationship between AR, MR and TR

Units Sold Price (AR)	Price	TR (pxq)	AR (TR/q)	MR (TRn –TRn–1)
1	10	10	10	10
2	9	18	9	8
3	8	24	8	6
4	7	28	7	4
5	6	30	6	2

The above table shows that as AR or price falls from Rs. 10 to Rs. 6, the TR increases from Rs. 10 to Rs. 30 at a diminishing rate. MR in this case falls from Rs. 10 to Rs. 2. MR is the rate at which TR changes. When we compare AR with MR, we find that AR falls at a slow rate whereas MR

falls at a faster rate.

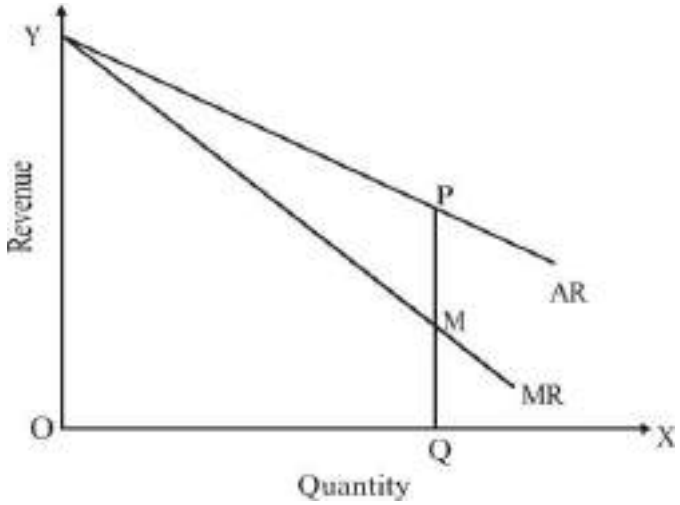


Figure 9 AT OQ output, AR is PQ whereas MR is MQ.

PQ > MQ

AR > MR (Since AR = P) or P > MR

6.8.3 Revenue Curve Under Monopoly

Under the Monopoly market, there is a single seller in the market. Thus, a monopolist is a price maker. It implies that if a monopolist firm wants to sell more in the market, it can reduce the price of the product. The demand curve for the monopolist's product is also market demand curve for the product since by definition the monopolist is the only supplier in the industry. As the demand curve of the consumers for a product slope downwards, the monopolist faces a downward sloping demand curve. It thus implies that the monopolist can expand the demand for his product by lowering the price. The market demand curve facing downward the monopolist can expand the demand for his product curve since price is identical with average revenue. Unlike perfect competition, where average revenue curve is a horizontal straight line, average revenue curve of the monopolist is downward sloping. It shows the sales he would be able to have at different prices. Since average revenue curve slopes downwards. Throughout its length marginal revenue curve will also slope downward and lie below average revenue curve. It because marginal revenue fails at a much faster rate than the average revenue. It implies that whenever the monopolist sells a large quantity, the price of his product falls, hence marginal revenue must be less than the price.

Under this type of market, the firm's average revenue curve slopes downward from left to right.

Accordingly, the firm's AR curve or demand curve or price line slopes downward. Also, if the AR curve slopes downward, the MR curve also slopes downward, and faster than the AR curve. So that MR<AR.

The average revenue and marginal revenue are related to each other through elasticity of AR curve, MR can be known with the help of the following formula:

MR = AR[e/e-1]

Here AR stands for average revenue and e for elasticity AR can also be known by the following formula:

Price = AR = MR[e-1/e]

Since elasticity will be less unity, MR will be less than price. The extent to which MR lies below AR depends upon the value of the fraction

It becomes evident from the fig10 (a) that where elasticity of AR curve is greater than unity. MR is always positive. Where it is equal to unity, MR is always Zero. In case the elasticity of AR curve is unit throughout its length like a rectangular hyperbola, the MR curve will coincide with X- axis as shown with dotted line in Figure 10 (b).

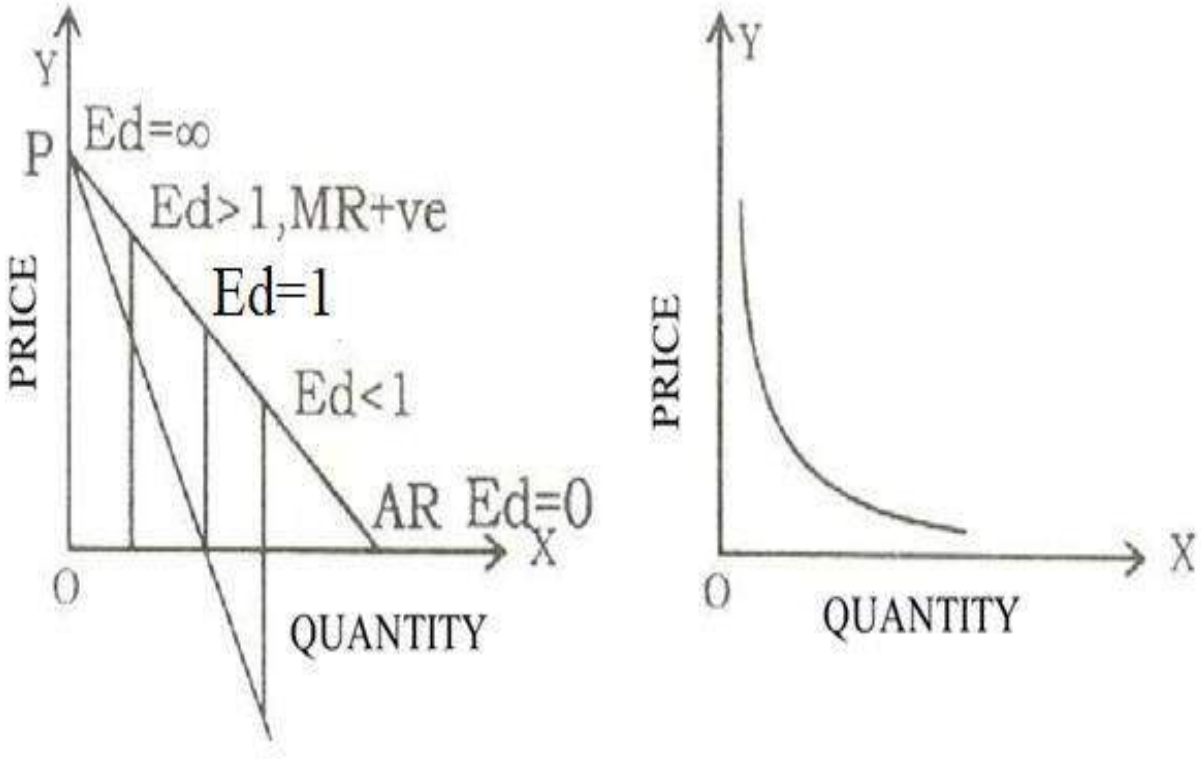


Fig. 10(a) Fig. 10 (b)

The following schedule illustrates the behaviour of AR, MR and TR in a monopoly market:

Table 9: Relationship between AR, MR and TR

Output/Sales Q (In units)	**Average Revenue AR = TR/Q = Price (in Rs.)**	**Total Revenue TR = AR*Q (In Rs)**	**Marginal Revenue MR = TRn– TRn-1 (In Rs.)**
1	20	1*20=20	20
2	18	2*18=36	16
3	16	3*16=48	12
4	14	4*14=56	8
5	12	5*12=60	4

The above table 9 shows that the monopolist sells 5 units of a product when the price is Rs.12 per unit. If it increases its price to Rs.14, he can sell only 4 units. Similarly, as he tries to increase the price, the demand for the same would decline.

On the other side, in a monopoly market, if a firm wants to sell more units, it will lower the price of the product. In the table, it is evident that if the firm increases the sales from 1 unit to 2 units, the price would be reduced to Rs.18 from Rs.20. Likewise, the increment in sales to 3,4 and 5 units results in a reduction in prices to Rs.16, Rs.14 and Rs.12 respectively.

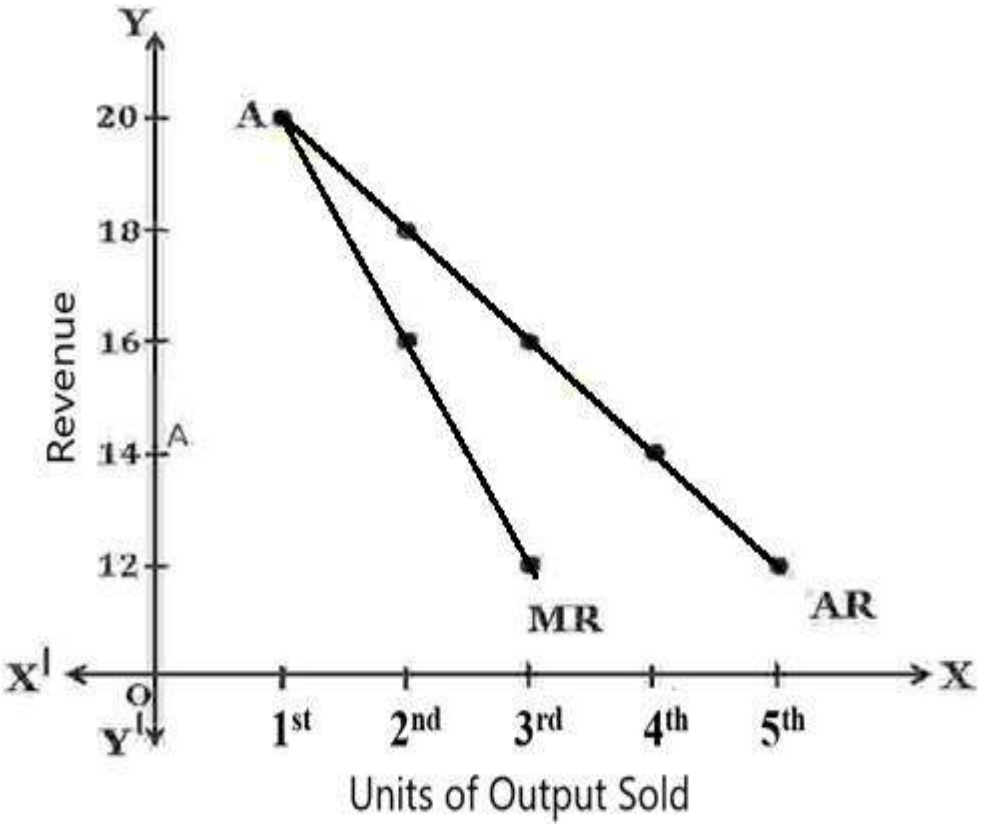


Figure 11

In fig 11, X-axis shows the output and Y-axis shows the average revenue and marginal revenue. Here, AR shows the average revenue curve and MR shows the marginal revenue curve. The point A indicates equal AR and MR. Furthermore, the AR curve slopes downward showing less price with an increase in sales of output. It represents that a monopoly firm must lower the price or AR of product to sell more of it. Also, If AR falls, MR would also fall but faster than the AR resulting in MR < AR.

6.8.4 Revenue Curve under Monopolistic Competition

Under Monopolistic competition, the market involves features of both perfect competition and monopoly. It is more common than in the other two markets. Furthermore, in this type of market, there are a large number of sellers having products with some differentiation to create a monopoly in the market. As a result, there wouldn't be more close substitute and competitive product in the market. It implies that if a monopolist firm wants to sell more in the market, it can reduce the price of the product. Under this type of market, the firm's average revenue curve slopes downward from left to right.

Table 10: Relationship between AR, MR and TR

Output/Sales Q (In units)	Average Revenue AR = TR/Q = Price (in Rs.)	Total Revenue TR = AR*Q (In Rs)	Marginal Revenue MR = TRn– TRn-1 (In Rs.)
1	20	1*20=20	20
2	19	2*19=38	18
3	18	3*18=54	16
4	17	4*17=68	14
5	16	5*16=80	12

he above table 10 shows that the monopolistic firm sells 5 units of a product when the price is Rs.16 per unit. If it increases its price to Rs.17, he can sell only 4 units. Similarly, as he tries to increase the price, the demand for the same would decline.

On the other side, in a monopolistic market, if a firm wants to sell more units, it will lower the price of the product. In the table, it is evident that if the firm increases the sales from 1 unit to 2 units, the price would be reduced to Rs.19 from Rs.20. Likewise, the increment in sales to 3,4 and 5 units results in a reduction in prices to Rs.18, Rs.17 and Rs.16 respectively.

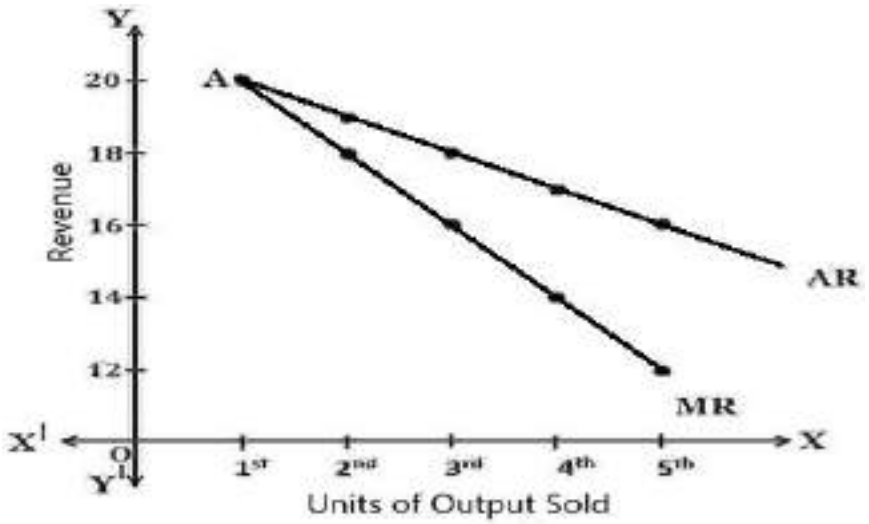


Figure 12

In fig 12, X-axis shows the output and Y-axis shows the average revenue and marginal revenue. Here, AR shows the average revenue curve and MR shows the marginal revenue curve. The point A indicates equal AR and MR. Furthermore, the AR curve slopes downward showing less price with an increase in sales of output. It represents that a monopolistic firm must lower the price or AR of product to sell more of it. Also, If AR falls, MR would also fall but faster than the AR resulting in MR < AR.

The difference between the monopoly and monopolistic competition is that under monopolistic competition, the AR curve is more elastic. It means that in response to a given change in price, the change in demand will be relatively more for a monopolistic competitive firm than monopoly firm. It is because of the availability of close substitutes in monopolistic competition and there is no close substitute in monopoly.

6.9 Significance of Revenue Curves

The main points of the significance of AR and MR curves are as under:

A. Estimation of Profits and Losses: A producer finds out whether he is making supernormal profits, normal profits or sustaining losses. For this purpose, he compares AR with AC:

IF AR > AC, the firm makes the supernormal profits. IF AR = AC, the firm earns normal profits.

IF AR < AC, the firm sustains losses.

B. Equilibrium: The other point of importance of AR and MR curves is to know how much a producer should produce. The firm will be in equilibrium at that point where MR

= MC. This is a general condition for the firm under all market situations.

C. Capacity Utilisation: It is through revenue curves that we come to know whether a firm is producing to its full capacity or not e.g. under perfect competition, if AR curves are tangent to AC curve at its minimum point, the firm will be producing at its full capacity.

D. Price Changes: The concepts of AR and MR are also useful to the factor services (such as rent, wages, interest and profits) in determining their prices. In factor pricing, they become

inverted U-shaped. The AR and MR curves become ARP and MRP (Average Revenue Productivity and Marginal Revenue Productivity).

Check Your Progress-II

Q1. Explain the shape of revenue curves in perfect competition.

Ans._____

_____

Q2. Explain the shape of revenue curves in imperfect competition.

Ans._____

_____

Q3. Why AR curve slopes downward in monopoly?

Ans._____

_____

6.10 Summary

In the short run, almost all the factors of production are fixed in quantity and the total fixed costs (TFC) include the expenditures of the firm per unit of time for all the fixed inputs. Similarly, the total variable costs (TVC) is the total expenditure incurred by the firm per unit of time for all variable inputs. Total cost equals total fixed cost plus total variable cost. Some other concepts of costs include explicit costs and implicit costs. Explicit cost includes the value of actual inputs used by the firm to produce the product. The value inputs owned by the firm should be estimated from what they could earn in their best alternative use. Cost curves are a useful tool to analyse firm behaviour. In most cases, we can observe three properties of cost curves. The marginal cost curve eventually rises as output increases, the average total cost curve is U-shaped, and the marginal cost curve intersects the average total curve at its bottom.

Revenue refers to the amount received by a firm from the sale of a given quantity of a commodity in the market. Revenue is a very important concept in economic analysis. It is directly influenced by sales level, i.e., as sales increases, revenue also increases. The revenue concepts are concerned with total revenue, average revenue and marginal revenue. When MR falls but is positive, TR increases at a diminishing rate. When MR is zero, TR is at its maximum point. When MR falls and

becomes negative, TR starts falling. Revenue curves have different shapes in different market forms. Revenue curves are important for price as well as for profit determination.

6.11 Questions for Practice

A. Short Answer Type Questions

Q1. What do you mean by Private and Social Costs?

Q2. Write a short note on:

- Explicit cost
- Opportunity cost
- Money cost

Q3. Explain the concept of fixed and variable cost of traditional theory of cost.

Q4. Define short run average cost curve under traditional theory of cost

Q5. Explain the relationship between AC and MC under short period of traditional cost.

Q6. Discuss short run marginal cost curve under traditional theory of cost

Q7. Explain long run cost curve under modern theory

Q8. Define the terms

a. Total Revenue

b. Marginal Revenue

Q9. Discuss the relationship between TR, AR and MR with the help of suitable diagram.

Q10. Why elasticity of AR curve is greater than unity, MR is always positive and where it is equal to unity?

Q11. Explain the short run curves under monopoly.

B. Long Answer Type Questions

Q1. Explain the relationship among average cost and marginal cost. Why average cost curve is U-shaped?

Q2.Explain short run cost curves in detail under traditional theory of cost.

Q3. Why LAC curve is also called envelop curve and why it is U-shaped under traditional theory of cost?

Q4. Discuss the concept of short run cost curves of modern theory of cost with the help of diagrams.

Q5. Explain the types of revenue curves with the help of table and diagrams.

Q6. Discuss the relationship between TR, AR, MR and elasticity of demand with the help of suitable table and diagram.

Q7. Explain the behaviour of AR and MR under monopoly and monopolistic competition.

Q8. What are the shapes of AR and MR under perfect and imperfect competition and why?

Q9. What is the effect of elasticity on shape of revenue curves under monopolistic competition?

6.12 Suggested Readings

- Baumol, W.J.: Economic Theory and Operations, Analysis
- Hicks, J.R: Value and Capital, 2nd Edition, Oxford University Press
- Koutsoyiannis: Modern Microeconomics
- Robinson, Joan: The Production Functions
- Samuelson, P.A: Foundation of Economic Analysis
- Stonier A.W. and D.C. Hague: A Text Book of Economic Theory
- H.L. Ahuja: Principles of Microeconomics

BACHELOR OF ARTS

SEMESTER –I

COURSE: MICRO ECONOMICS

UNIT 7: PERFECT COMPETITION: FIRM AND INDUSTRYEQUILIBRIUM

STRUCTURE

7.0 Learning Objectives

At the end of this unit, learner will be able to:

- Explain the concept of perfect competition and its features.
- Identify the effects of changes in demand and supply on price.
- Discuss price determination in market time, short time period and long time.
- Determine equilibrium of firm and industry under identical cost conditions.
- Analyse equilibrium of firm and industry under different cost conditions.

7.1 Introduction

The term 'market' is defined as a place where buyers and sellers meet each other for the sale and purchase of commodity. According to Cournot, "Economists understand by the term market not any particular market place in which things are bought and sold but the whole of any region in which buyers and sellers are in such free intercourse with each other that the price of same good tends to equality easily and quickly". Markets can be divided into two broad parts on the basis of competition i.e. perfect competition and imperfect competition. Further, imperfect competition is divided into four parts i.e. monopoly, monopolistic competition, duopoly and oligopoly. In this unit, perfect competition, its features, price and output determination of firm and industry have been analysed.

7.2 Perfect Competition and its Features

Perfect competition is a market form in which there exists large number of buyers and sellers selling homogenous products. According to Chong Yah, "Perfect competition is a market situation where there is a large number of sellers and buyers, a homogeneous product, free entry of firms into the industry, perfect knowledge among buyers and sellers of existing market conditions and free mobility of factors of production among alternative uses." The various characteristics or assumptions of perfect competition are as follows:

A. **Large Number of Sellers and Buyers:** In perfect competition, the number of sellers aswell as buyers is infinitely large. The presence of large number of buyers implies that demand for various commodities is continuous and intense in nature. The presence of large number of sellers implies that cut throat competition exists between sellers and buyers. Under perfect

competition, presence of large number of sellers indicates that individual seller sells only a small amount of the total demand of the product. Hence, individual seller does not have control over the supply of the given product and cannot influence the price of the same. Therefore, individual firm is considered to be price taker not the price maker. The market forces of demand and supply help to determine the price of the product in this market situation, moreover these conditions are given for an individual firm. An individual firm has to decide whether it want to sell larger amount or the smaller of the product at given prices. Therefore, average revenue curve or demand curve for an individual firm is perfectly elastic i.e. parallel to X axis and marginal revenue curve is also a straight lineparallel to X axis which coincides withaverage revenue curve. Marginal as well as average revenue curveshave been shown in figure 1. The quantity and price have been measured on X axis and Y axis, respectively. Op is the given price for the individual firm and at this price firm can sell any amount of the commodity. Therefore, average revenue (AR) curve is perfectly elastic i.e., parallel to X axis and marginal revenue (MR) curve coincides with AR curve.

B. Homogenous Products: The products are homogenous in nature in perfect competition. Homogenous means same in quality, size, colour, form etc. In the market, products are perfect substitutes for each other and cross elasticity of demand is infinite in case of such products. The price of every unit of product is same as products are identical. If any firm charges slightly higher price for the given product, whole of the demand will shift to the other producers and consequently, firm will have to reduce the price to the original level and vice-versa.

C. Free Entry and Exit of Firms: In perfectly competitive market, firms are allowed to freely enter and exit the industry. If there exists supernormal profit in any industry, firm can independently choose to enter the industry but if there exists situation of losses in the industry, firm can leave the industry freely. The free entry and exit of firms imply that there is slight possibility of the emergence of monopoly and single firm cannot control the price and supply of the product.

D. Perfect Knowledge: In perfect competition, sellers as well as buyers have perfect knowledge of market conditions i.e. price, demand and supply. If buyers have perfect knowledge of price and supply conditions then it is not possible for sellers to charge higher price from buyers. Hence, same price will be charged for a certain product throughout the market. If sellers have perfect knowledge of demand conditions, then possibility of over-production or shortage does not exist. Moreover, there is no need for the sellers to advertise their products due to homogenous products and perfect knowledge of market conditions.

E. Perfect Mobility of Factors of Production: There exists perfect mobility of all the factors of production in the perfectly competitive market. A slight increase in the price of a certain factor will allow the movement of that factor units from other firms or industries to the specific firm or industry. As a result, the price of that factor will come down to the original level in the specific firm or industry. Hence, prices of various factors of production also remain same in the perfect competition.

F. Absence of Controls: The controls on the free choice of producers and consumers in form of price controls, rationing etc. do not exist in perfect competition. If government imposes restrictions, then forces of competition cannot perform their work i.e. free and continuous adjustments in the market, efficiently.

G. Absence of Transport Cost: In perfect competition, cost for moving the product from one place to another is assumed to be constant. In this market situation, transportation of the products is not required as number of sellers is large, products are homogenousin nature and every commodity is easily available in every locality, village, town and city.

7.3 Price Determination under Perfect Competition

In perfectly competitive market, individual firm is not a price maker rather a price taker. Nowthe question arises, how the price is being determined under perfect competition. Different economists have given different views regarding this issue. According to Jevons and his followers, price of a commodity is always equal to its marginal utility (MU) i.e. MU=Price. Ifprice is more than the marginal utility i.e. Price > MU, consumer will reduce the purchase of the commodity.

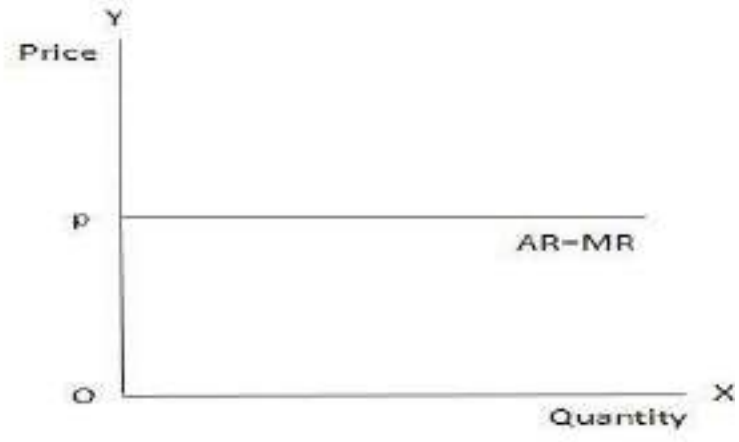


Figure 1: Average Revenue and Marginal Revenue Curves

Consequently, demand of the commodity will decline which will further reduce the price of the commodity and it will become equal to the marginal utility of the commodity. If price is less than the marginal utility i.e. Price < MU, consumer will increase the purchase of the commodity. Consequently, demand of the commodity will increase which will further increase the price of the commodity and it will become equal to the marginal utility of the commodity. Hence, Jevons and his followers has analysed that price of a good isdetermined by its demand alone. Higher the demand of a commodity, higher will its price andvice-versa. On the other hand, Ricardo, Mill and other economists have propounded the idea that price of a commodity is determined by the supply force only. In short time period, supplycurve of the firm is its marginal cost curve. The force behind the supply curve is marginal cost. According to this view, price of a product is equal to its marginal cost (MC) i.e. Price=MC. If MC > Price, then firm will be incurring losses. Hence, the supply of the productwill be reduced which further increases the price of the product and it will become equal toits marginal cost. If MC <Price, then firm will be earning profits. Hence, the supply of the product will be increased which further declines the price of the product and it will become equal to the marginal cost. Therefore, price of a commodity is determined by its supply only. Higher the supply of a commodity, lower will be its price and vice-versa.

Table 1: Price Determination under Perfect Competition

Price of Apples(in Rs. per Kilogram)	Demand for Apples (in Kilograms)	Supply of Apples (in Kilograms)	Changes in Price
20	120	40	D > S, Increase in Price
30	100	60	
40	80	80	D=S, Equilibrium Price
50	60	100	D < S, Decline in Price
60	40	120	

According to Marshall, views of Jevons and his followers as well as Ricardo and his followers are not completely right as price of a commodity is determined neither by its demand only nor by its supply alone. The price of a commodity is determined by both its demand as well as supply. This concept has been explained by Marshall with the help of an example of a pair of scissors.

Whenever, a cloth piece is cut by scissors, it seems that only one blade cuts the cloth piece and other remains fixed. If we conclude that one blade of scissors is enough to cut a cloth piece that is totally wrong. If a person is given one blade of scissors to cut a cloth piece then he will not be able to do this. Therefore, both the blades is significant to cut a cloth piece. Hence, price of a commodity cannot be determined either by its demand alone or by its supply alone rather both demand and supply is needed to determine price. If the demand for a product is more than its supply, then it will intensify competition among buyers. Therefore, price has tendency to increase. If the supply of a product is more than its demand, then it will intensify competition among sellers. Therefore, price has tendency to decline. If supply of a commodity is exactly equal to its demand then there will be no competition among buyers as well as sellers.

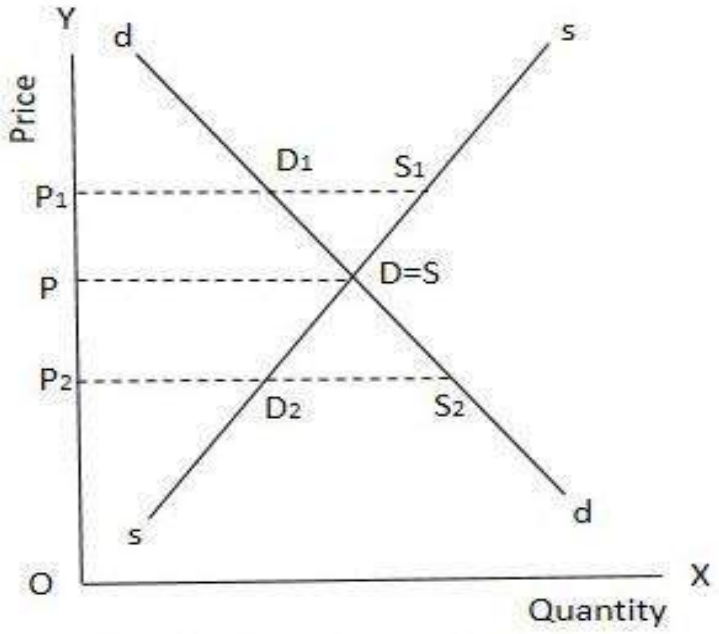


Figure 2: Price Determination

Hence, there is no tendency for the price of a commodity to rise or fall. Therefore, equilibrium price will be determined at a point where there is equalitybetween the demand for andsupply of a commodity. This concept has been explained with the help of a table 1. At price Rs. 20, the demand for apples is 120 kg and supply is 40 kg. Excess ofdemand over supply will intensify competition among buyers which pushes the price to Rs. 30. At price Rs. 30, the demand for apples is 100 kg and supply is 60 kg. Competition among buyers will continue due to excess of demand over supply which further pushes the price to Rs. 40. At price Rs. 60, the demand for apples is 40 kg and supply

is 120 kg. Excess of supply over demand will intensify competition among sellers which reduces the price toRs. 50. At price Rs. 50, the demand for apples is 60 kg and supply is 100 kg. Competition among sellers will continue due to excess of supply over demand which further reduces the price to Rs. 40. At price Rs. 40, demand for and supply of apples are equal to each other i.e. 80 kg. At this price, there will no competition among buyers as well as sellers and price hasno tendency to increase or decrease. Therefore, Rs. 40 is the equilibrium price which is determined by the equality between supply of and demand for apples. The determination of price under perfect competition has been explained with the help of figure 2. In this figure, ddis the demand curve and ss is the supply curve. At price OP_1, supply is more than demand i.e. $P_1S_1 > P_1D_1$. Excess of supply over demand will reduce the price to OP. At price OP_2, demandis more than supply i.e. $P_2S_2 > P_2D_2$. Excess of demand over supply will increase the price to OP. At price OP, demand is exactly equal to supply i.e. PD = PS. At this price, there will be no competition among buyers or sellers and price has no tendency to increase or decrease. Therefore, equilibrium price is determined by equality between supply of and demand for a commodity.

6.3.1 Effects of Changes in Supply and Demand on Price

The effects of changes in supply and demand on price can be divided into three parts i.e. effects of changes in demand on price, effects of changes in supply on price and effects of simultaneous changes in supply and demand on price.

A. Effects of Changes in Demand on Price

If supply of a commodity is given, increase in demand for a commodity will cause the price to rise due to excess of demand over supply. If supply of acommodity is given, decrease in demand for a commodity will cause the price to decline due to excess of supply over demand. This phenomenon has been explained with the help of figure 3.

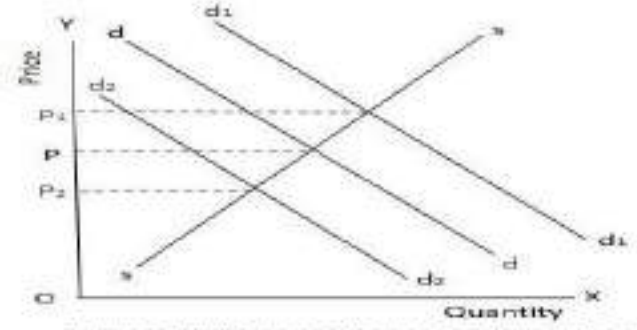


Figure 3: Effects of Change in Demand on Price

In this figure, price is measured on Y axis as wellas quantity demanded and supplied on X axis. ss is the supply curve and dd is the demand curve. By the intersection of demand curve dd and supply curve ss, OP price is determined. If supply is given but demand increases to d_1d_1, there will be intense competition among buyers on price OP. Therefore, price rises to OP_1 with increase in demand. The price OP_1 is determined by the intersection of demand curve d_1d_1 and supply curve ss. If supply is given but demand decreases to d_2d_2, there will be intense competition among sellers on price OP. Therefore, price declines to OP_2 with decrease in demand.The price OP_2 is determined by the intersection of demand curve d_2d_2 andsupply curve ss.

B. Effects of Changes in Supply on Price

If demand for a commodity is given, increase in supply of a commodity will cause the priceto decline due to excess of supply over demand. If demand for a commodity is given, decrease in supply of a commodity will cause the price to increase due to excess of demand over supply. This phenomenon hasbeen explained with the help of figure 4.

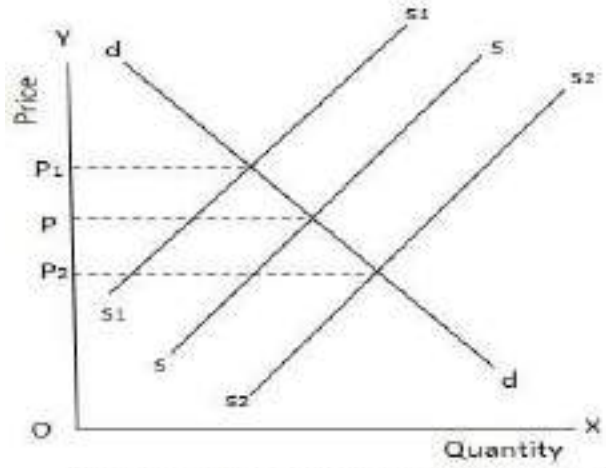


Figure 4: Effects of Change in Supply on Price

In this figure, price is measured on Y axis as well as quantity demanded and supplied onX axis. ss is the supply curve and dd is the demand curve. By theintersection of demand curve dd and supply curve ss, OP price isdetermined. If demand is given but supply increases to s_2s_2, there will be intense competition among sellers on price OP. Therefore, price declines to OP_2 with increase in supply. The price $OP_2$is determined by the intersection of demand curve dd and supply curve s_2s_2. If demand is given but supplydecreases to s_1s_1, there will be intense competition among buyers on price OP. Therefore, price increases to OP_1 with decrease in supply. The price $OP_1$is

determined by the intersection of demand curve dd and supply curve s_1s_1.

C. Effects of Simultaneous Changes in Supply and Demand on Price

If demand for a commodity rises but its supply declines at the same time, the price of a commodity will increase. If demand for a commodity declines but its supply increases at the same time, the price of a commodity will decrease. This concept has been explained with the help of figure 5 (A). In this figure, price is measured on Y axis as well as quantity demanded and supplied on X axis. ss is the supply curve and dd is the demand curve. By the intersection of demand curve dd and supply curve ss, OP price is determined. If demand for a commodity rises to d_1d_1 but its supply declines to s_2s_2 at the same time, the price of a commodity will

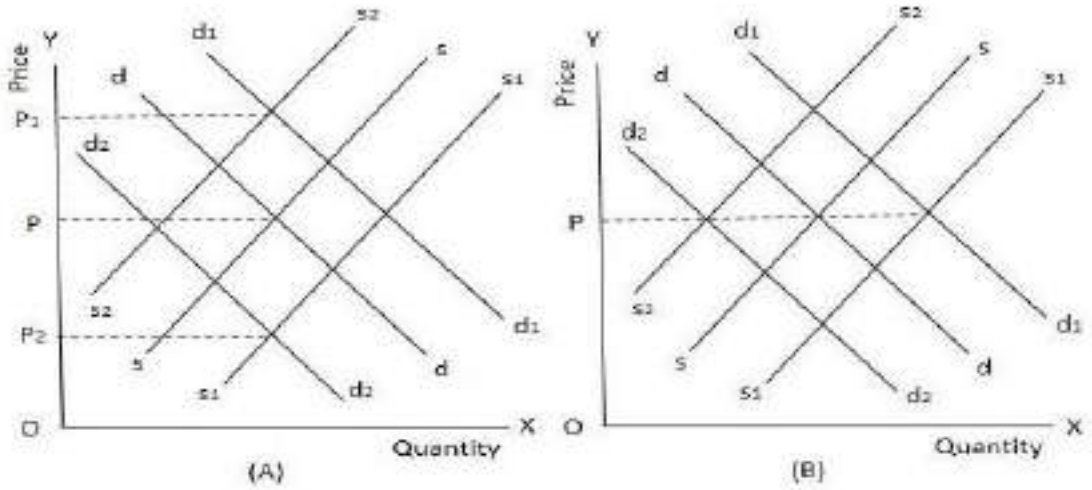


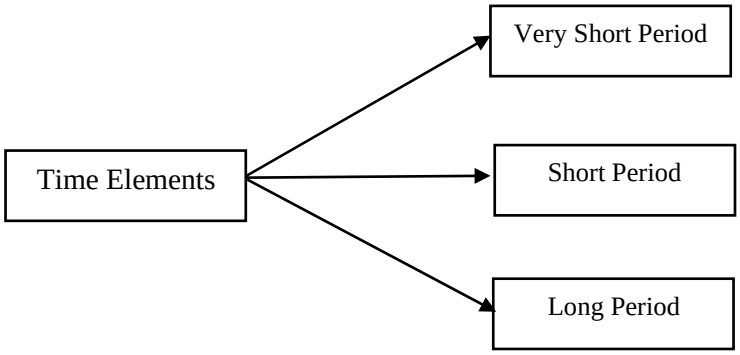
Figure 5: Effects of Simultaneous Changes in Demand and Supply on Price

increase to OP_1. The price OP_1 is determined by the intersection of demand curve d_1d_1 and supply curve s_2s_2. If demand for a commodity declines to d_2d_2 but its supply increases to s_1s_1 at the same time, the price of a commodity will decrease to OP_2. The price OP_2 is determined by the intersection of demand curve d_2d_2 and supply curve s_1s_1.If demand for and supply of a commodity, changes in the same direction and in equal proportion, the equilibrium will remain unchanged. This concept has been explained with the help of figure 5 (B). In this figure, price is measured on Y axis as well as quantity demanded and supplied on X axis. ss isthe supply curve and dd is the demand curve. By the intersection of demand curve dd and supply curve ss, OP price is determined. If demand increases to d_1d_1 and supply increases to s_1s_1, price will remain unchanged at OP. If demand declines to d_2d_2 and supply decreases to s_2s_2, price will

remain unchanged at OP. if the rise in demand is more than the rise in supply, the equilibrium price will increase. If the rise in supply is more than the rise in demand, the equilibrium price will decline. It is not only the relative magnitudes of changes in supply and demand which affect the changes in equilibrium prices but relative magnitudes of the elasticities of supply and demand also affect the equilibrium price.

6.3.2 Price Determination under Different Time Periods

According to Marshall, price of a commodity is determined by its demand as well as supply under perfect competition. Now the question arises, is it demand or supply which has greater impact on price of a commodity. Marshall has given answer to this question. According to Marshall, "As a general rule, the shorter the period which we are considering the greater must be the share of our attention which is given to the influence of demand on value, and longer the period, the more important will be the influence of cost of production on value."



The price of a commodity is affected more by demand or supply is determined by the time element. In short time period, it is very difficult for the sellers to adjust supply in accordance with demand. In long time period, sellers can easily adjust supply in accordance with demand. Therefore, in short time period, the influence of demand is more on price and in long time period, the impact of supply is more on price. To study price determination under perfect competition, time element has been divided into three parts i.e. market time period, short time period and long time period.

6.3.2.1 Determination of Very Short Period (Market Price)

The market time period is that time period in which supply of a commodity is perfectly inelastic as it is almost impossible to adjust supply according to the demand for a commodity.The market time period is also known as very short time period. Suppose, there is supply of 100 kg apples at

a given place on a particular day. Suddenly, the demand for apples increases to 200 kg. It is not possible to increase supply of apples in very short time period. Increase in demand for apples will rise competition among buyers, consequently there will be increase in the price of apples. The market price is that price which actually prevails in the market at a particular point of time. If there is sudden increase in demand, the market price will also rise instantly. If there is sudden decrease in demand, the market price will also fall instantly. The determination of market price can be discussed in case of perishable goods and non- perishable goods.

(A) Determination of Market Price in case of Perishable Goods

The perishable commodities are those commodities whose quality deteriorates within market time period or very short time period e.g. milk and milk products, fruits, vegetables etc. The producers want to sell these commodities immediately after their production as it is not possible to store these commodities for longer time period. Therefore, entire production of these commodities is supplied in the market immediately to avoid deterioration in the quality of these commodities. If demand for these commodities increases, it will lead to rise in price as supply of these goods is fixed in market time period. Contrary to it, if demand for these commodities decreases, supply will be more than its demand which will cause the price to decline in order to sell entire stock of these commodities. Therefore, increase in demand will lead to rise in prices and decrease in demand will lead to fall in prices in case of perishable commodities. This phenomenon has been explained with the help of figure 6 (A).In this figure, price is measured on Y axis as well as quantity demanded and supplied on X axis. sq_0 is the supply curve and dd is the demand curve. By the intersection of demand curve dd and supply curve sq_0, OP price is determined. If demand for a commodity rises to $d_1d_1$but its supply remains fixed at sq_0, the price of a commodity will instantly increase to OP_1. The priceOP_1 is determined by the intersection of demand curve d_1d_1 and supply curve sq_0. If demand for a commodity declines to d_2d_2 but again its supply remains fixed at sq_0, the price of a commodity will instantly decrease to OP_2. The price OP_2 is determined by the intersection of demand curve d_2d_2 and supply curve sq_0.

(B) Determination of Market Price in case of Non-perishable Goods

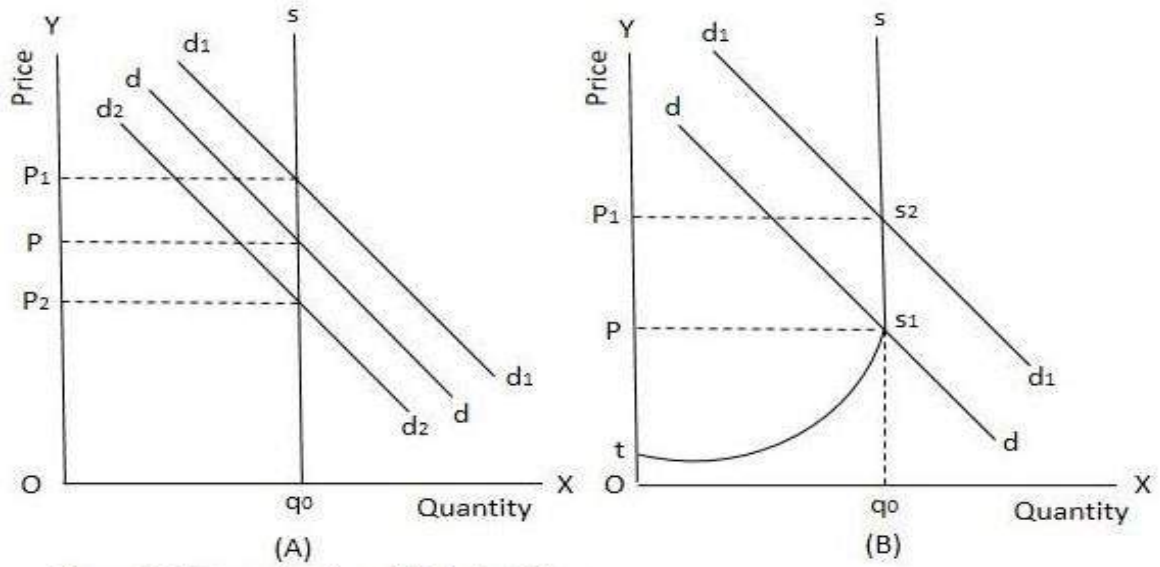


Figure 6: Determination of Market Price

The non-perishable commodities are those commodities that can be stored for a considerable period of time as their quality does not deteriorate within market time period or very short time period e.g. household furniture, shoes, toys, motor cars, cloth, etc. In case of non-perishable commodities, the concept of reserve price exists in the minds of producers.

Reserve price is the minimum price at which producer does not want to sell any amount ofthe good. If market price of non-perishable commodities declines to reserve price or below it, producer will not sell any amount of the good rather he will store the commodity until price increases more than its reserve price. If price increases above the reserve price, producer will try to sell more and more amount of commodity. The producer is willing to sell the entire existing stock of the commodity at certain maximum level of price. If there is rise in demand after this maximum level, the supply becomes perfectly inelastic. The supply curve of non- perishable commodities in market time period is partly more elastic and partly perfectly inelastic. This concept has been explained with the help of figure 6 (B). In this figure, price ismeasured on Y axis as well as quantity demanded and supplied on X axis. Ot is the reserve price at which producer is not willing to sell any amount of a commodity. ts_1s is the supply curve and dd is the demand curve.The ts_1 part of supply curve is more elastic and s_1s part of supply curve is perfectly inelastic. At price OP, entire existing stock of a good i.e. Oq_0 is available for sale. Beyond this point, supply is perfectly inelastic. If demand increases to d_1d_1,supply will remain fixed at Oq_0 but price will rise to OP_1instantly. OP_1 price is determined by the intersection of demand curve d_1d_1 and inelastic part of supply curve s_1s.

6.3.2.2 Determination of Short-run Price

Short time period is that time period in which some factors of production are fixed and others are variable in nature. This time period is longer than the market time period. Hence, supply of a commodity can be increased to some extent by increasing the units of variable factors of production i.e. labour and rawmaterial. Therefore, short runsupply curve is more elastic than perfectly inelastic supply curve of market time period. The supply curve of an industry in short time period is upward sloping from left to right. If there is rise in demand for a commodity, price willincrease but remains lower than the market price and higher than the original price. It is lower than market price as supply can be increased to a limited amount in short run. It is higher than the original price as complete adjustment of supply and demand is not possible in short run. The determination of short run price has been shown in the figure 7.

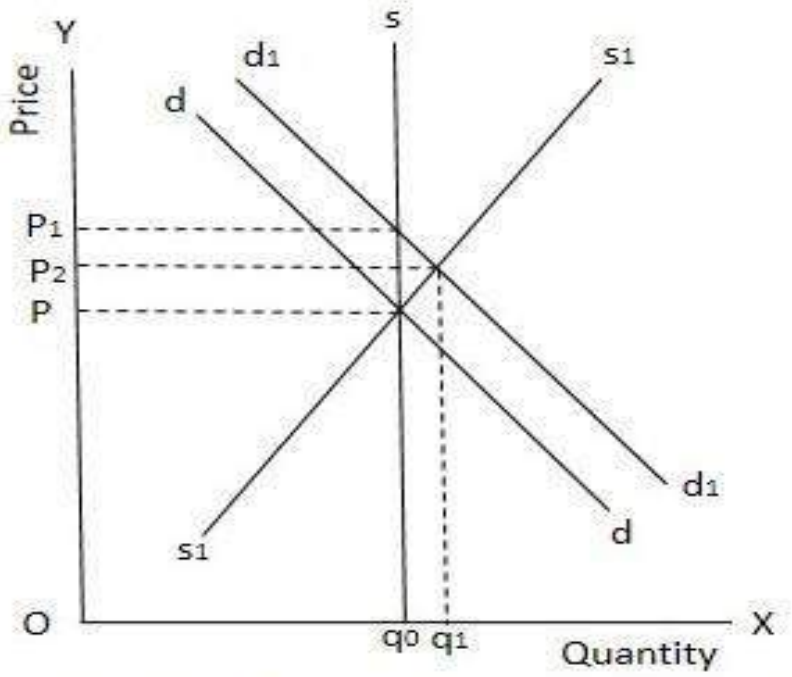


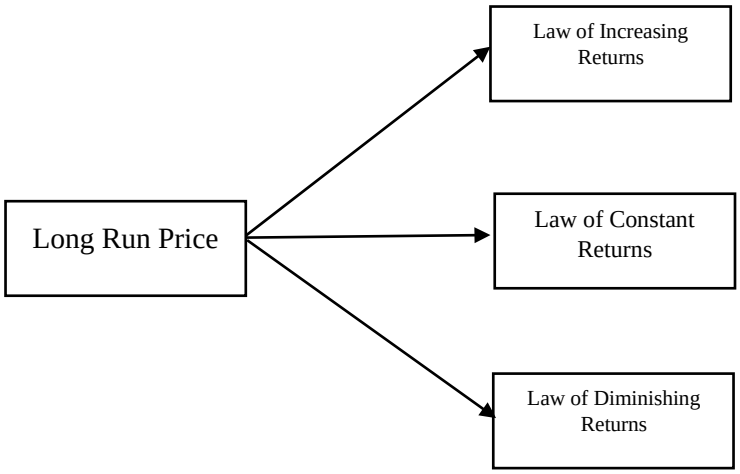
Figure 7: Determination of Short-run Price

In this figure, price is measured on Y axis as well as quantity demanded and supplied on X axis. dd is original demand curve, ss is supply curve in market time period, Oq_0 is the quantity supplied and OP is the market price. If demand increases to d_1d_1, the intersection of d_1d_1 and ss will determine price at higher level OP_1 but quantity supplied will remain fixed at Oq_0. s_1s_1 is the short run supply curve which is more elastic than ss. The intersection between s_1s_1 and d_1d_1 determines

short run supply at Oq_1 and short run price at OP_2. Hence, price OP_2 is higher than original price OP and lower than market price OP_1.

6.3.2.3 Determination of Long-run Price

The long time period is not a specific time period. This time period varies from industry to industry. In case of transport industry, iron and steel industry and engineering goods industry,the long time period is of ten years but in case of cotton textile, it is of one year only. The long time period is that time period in which all the factors of production are variable in nature. According to Bober, long time period is "long enough to enable the firm to make adjustment to a changed demand by varying the size of the plant and equipment."



The long run price has been called normal price by Marshall and natural price by Adam Smith. The normal price is that price which prevails in long time period in the market, when there is complete adjustment among demand for and supply of commodity. Now the basic question is whether the long run price will become equal to original price or not. The answer to this question is that long run price can be more than, equal to and less than the original price based on the law of returns, operative in the given industry. Therefore, long run price can be determined in case of increasing costs industry, constant costs industry and decreasing costs industry.

A. Determination of Normal Price in Increasing Costs Industry

If the production is governed by law of increasing costs in a given industry, then diseconomies are more than the internal and external economies. In this phase, industry'slong run supply curve will be more elastic than short run supply curve. The long run supply curve will slope upward from

left to right. In this situation, normal price will be less than market price as well as short run price but more than the original price. This concept has beenexplained in the figure 8 (A).

In this figure, dd is original demand curve, sq_0 is supply curve in market period and the intersection of these two curves determine the market price at OP and market period supply at Oq_0. If demand rises to d_1d_1, its intersection with sq_0 will determine market price at higher level OP_1. s_1s_1 is the short run supply curve, its intersection with d_1d_1 will determine short run supply at Oq_1 which is higher than market period supply Oq_0 and short run price at OP_2 which is lower than market price OP_1. s_2s_2 is the long run supply curve, its intersection with d_1d_1 will determine long run supply at Oq_2 and long run price at OP_3. The long run supply Oq_2 is higher than market period supply Oq_0 as well as short run supply Oq_1. The long run price OP_3 is lower than market price OP_1 as well as short run price OP_2but higher than original price OP.

B. Determination of Normal Price in Constant Costs Industry

If the production is governed by law of constant costs in a given industry, then diseconomies are exactly equal to the internal and external economies. In this phase,

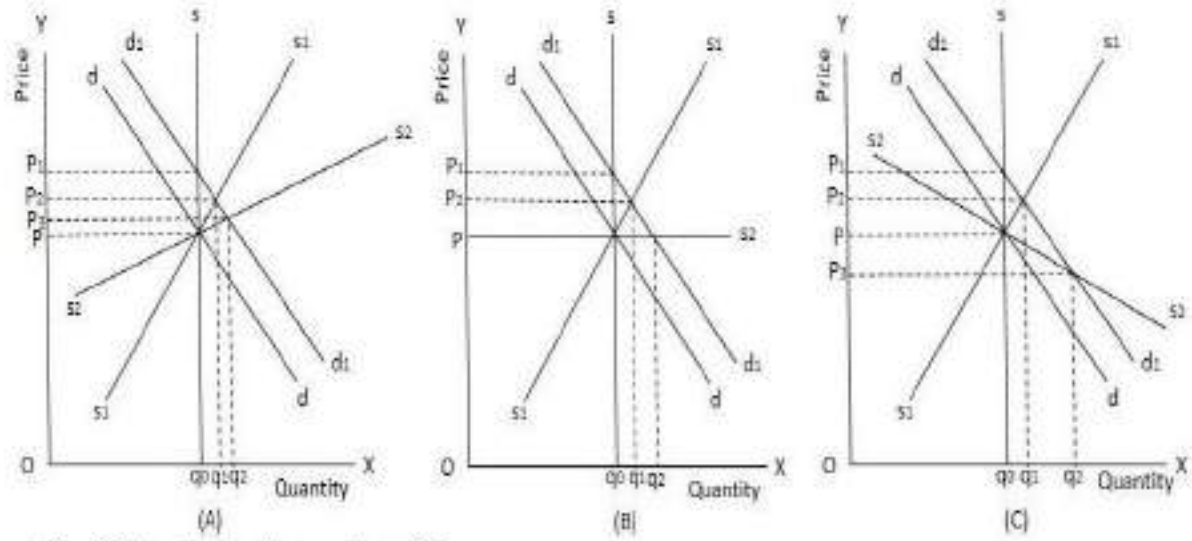


Figure 8: Determination of Long-run Normal Price

industry's long run supply curve will be a straight line parallel to X axis. In this situation, normal price will be less than market price as well as short run price but equal to the original price. This concept has been explained in the figure 8 (B). In this figure, dd is original demand curve, sq_0 is supply curve in market period and the intersection of these two curves determine the market price at OP and market period supply at Oq_0. If demand rises to d_1d_1, itsintersection with sq_0 will

determine market price at higher level OP_1. s_1s_1 is the short run supply curve, its intersection with d_1d_1 will determine short run supply at Oq_1 which is higher than market period supply Oq_0 and short run price at OP_2 which is lower than market price OP_1. Ps_2 is the long run supply curve, its intersection with d_1d_1 will determine long runsupply at Oq_2 and long run price at OP. The long run supply Oq_2 is higher than market period

supply Oq_0 as well as short run supply Oq_1. The long run price OP is lower than market price OP_1 as well as short run price OP_2 but equal to original price OP.

C. Determination of Normal Price in Decreasing Costs Industry

If the production is governed by law of decreasing costs in a given industry then diseconomies are less than the internal and external economies. In this phase, industry's long run supply curve will slope downward from left to right. In this situation, normal price will beless than market price, short run price and original price. This concept has been explained in the figure 8 (C). In this figure, dd is original demand curve, sq_0 is supply curve in market period and the intersection of these two curves determine the market price at OP and market period supply at Oq_0. If demand rises to d_1d_1, its intersection with sq_0 will determine market price at higher level OP_1. s_1s_1 is the short run supply curve, its intersection with d_1d_1 will determine short run supply at Oq_1 which is higher than market period supply Oq_0 and short run price at OP_2 which is lower than market price OP_1. s_2s_2 is the long run supply curve, its intersection with d_1d_1 will determine long run supply at Oq_2 and long run price at OP_3. The long run supply Oq_2 is higher than market period supply Oq_0 as well as short run supply Oq_1. The long run price OP_3 is lower than market price OP_1, short run price $OP_2$and original price OP.

Therefore, it can be said that shorter the time period, more is the influence of demand on price. Longer the time period, more is the influence of supply on price.

Check Your Progress-I

Q1: Explain the concept of perfect competition.

Ans:_____

_____

Q2: Define Market price and Normal price.

Ans:_____

_____

Q3: Discuss the effects of change in demand on price when supply remains the same.

Ans:_____

_____

7.4 Equilibrium of Firm and Industry under Perfect Competition

An Industry is a collection of various firms producing identical products. A firm is a singleunit engaged in production for sale at a profit and with an aim of maximising profit. A firm is in equilibrium when there is no tendency to increase or decrease the output.According to Koutsoyiannis, "A firm is in equilibrium when it maximises its profit."A profit maximising firm will go on increasing its output as long as rise in output provides larger profit to the firm.If a firm knows that reducing the output will provide larger profits, it will tend to reduce its output. If firm is already earning maximum profit, any increase or decrease in output may lead to decline in profit. In this phase, there is no tendency to expand or contract the output and this state is called the state of equilibrium. When the firm is incurring losses, its main aimis to minimise losses. The firm may increase or decrease its output as long as there is possibility of further decline in loss of the firm. The firm is in state of equilibrium when its losses are minimum. When the position of equilibrium is attained, firm has no tendency to change the level of output.

7.4.1 Conditions for the Equilibrium of Firm

In perfect competition, equilibrium of an individual firm can be explained with the help of two approaches. Firstly, total revenue and total cost approach. Secondly, marginal revenue and marginal cost approach. Both the approaches have been explained as below:

A. Total Revenue and Total Cost Approach

In total revenue and total cost approach, there are two possibilities for the firm to attain equilibrium i.e. either to earn maximum profit or to incur minimum losses. The firm will be earning profit, if total revenue is more than total cost. The profit will be maximum at a point where the gap between total revenue and total cost is maximum. At this stage, firm has no tendency to increase or decrease its output. Therefore, required condition for attaining equilibrium is firm must earn maximum amount of profit. If firm is incurring losses, its main aim is to minimise losses. The firm will be

incurring losses, if total cost is more than total revenue. The losses will be minimum at a point where the gap between total cost and total revenue is minimum. At this stage, firm has no tendency to increase or decrease its output. Therefore, if firm is incurring losses, required condition for attaining equilibrium is firm mustincur minimum amount of losses.

B. Marginal Revenue and Marginal Cost Approach

According to marginal revenue and marginal cost approach, two necessary conditions mustbe fulfilled by the firm to attain equilibrium level. Firstly, marginal cost (MC) must be equal to marginal revenue (MR). Secondly, marginal cost curve must cut the marginal revenue curve from below.

The equilibrium of firm as well as industry can be studied under two different conditions i.e., identical cost conditions and different cost conditions

7.42Equilibrium of Firm and Industry under Identical Cost Conditions

Equilibrium of firm and industry under identical cost conditions can be studied under shorttime period as well as long time period.

7.4.4.1 Short-run Equilibrium of Firm

The short time period is that time period in which some factors of production are fixed and others are variable in nature. During such a short span of time, it is not possible to establish new firms in the industry. It is also not possible for new firms to enter the industry and old firms to leave the industry within such a limited time. Hence, the number of firms remain fixed during short run. The product as well as factor units are assumed to be homogenous andtheir price remains same throughout the market under perfect competition. This states that all firms in the industry work under identical cost conditions in which cost curves of all the firmsare of same level and shape. In such a situation, price of a commodity is given for an individual firm and equilibrium of every firm will be determined at the same level of output.

Short-run equilibrium of Firmunder Identical Cost Conditions

- Very Short Period
- Long Period
- Short Period

The equilibrium of a firm in short time period can be attained by fulfilling following two necessary conditions:

(i) MC = MR

(ii) MC curve must cut marginal revenue curve from below.

Three situations can exist while attaining short-run equilibrium of a firm under identical cost conditions i.e., super-normal profits, losses and normal profits.

A. Firm's Equilibrium with Super-normal Profits

In short-run, firm's equilibrium with super-normal profits has been shown in figure 9. SMC and SAC are the short-run marginal cost and average cost curves, respectively. The average variable cost curve is AVC. All the three curves i.e. SMC, SAC and AVC are U-shaped. AR is average revenue curve andMR is marginal revenue curve at given price OP. The firm is in equilibrium at point E asat point E, MR=MC and MC curve cuts MR curve from below. OQ is the equilibrium level of output.

The total revenue is OP×OQ = OPEQ. The total cost is LQ×OQ = LQOK.

The firm will be earning super-normal profits as total revenue is more than total cost i.e. OPEQ > LQOK. The difference between total revenue and total cost is super-normal profit i.e. OPEQ – LQOK = KLEP. At output OQ, LQ is the average cost out of which MQ is average variable cost and LM is average fixed cost. The price OP or EQ is more than short run average cost LQ by EL. Hence, EL is profit per unit. At the point of equilibrium, total profit will be EL×LK (OQ) = ELKP.

B.

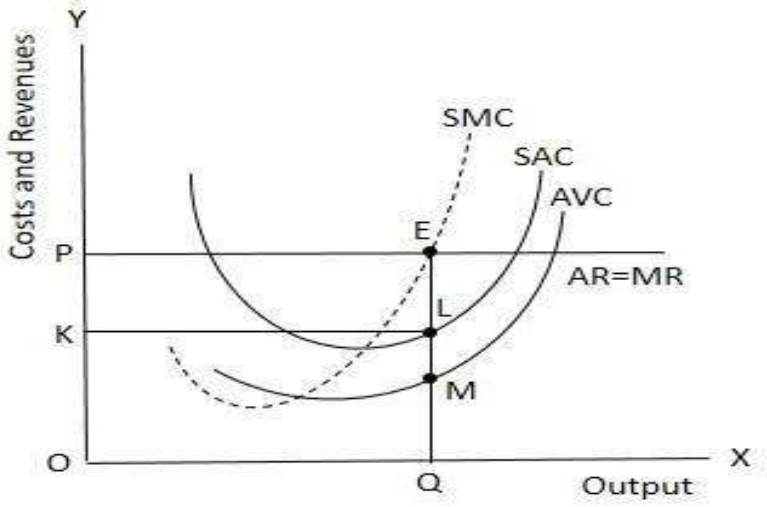


Figure 9: Equilibrium with Super-normal Profits

B. Firm's Equilibrium with NormalProfits

The firm will be earning normal profits if total revenue is equal to total cost. The firm's equilibrium with normal profits has been explained in figure 11. The firm is in equilibrium at point E as at point E,MR=MC and MC curve cuts MR curve frombelow. OQ is the equilibrium level ofoutput. The total revenue is OP×OQ = OPEQ. The total cost is EQ×OQ = OPEQ.

The firm will be earning normal profits when total cost is equal to total revenue i.e. OPEQ.At output OQ, EQ is the average cost out of which MQ is average variable cost and EM is average fixed cost. The price OP or EQ is equal to average cost which covers both average variable cost MQ and average fixed cost EM. In this phase, firm is in equilibrium with normal profits.

C. Firm's Equilibrium with Losses

In short-run, firm's equilibrium withlosses has been shown in figure 10. The firm is in equilibrium at point E as at point E, MR=MC and MC curve cuts MR curve from below.OQ is the equilibrium level of output. The total revenue is OP×OQ = OPEQ. The total cost is LQ×OQ =LQOK. The firm will be incurring losses as total cost is more than totalrevenue i.e. LQOK > OPEQ. The difference between total cost and total revenue is losses i.e. LQOK – OPEQ = KLEP. At output OQ, LQ is the average cost out of which MQ is average variable cost and LM is average fixed cost. The price OP or EQ is less than short run average cost LQ by EL. Hence, EL is loss per unit. At the point of equilibrium, total loss will be EL×EP (OQ) = ELKP. If the firm is incurring losses, the question arises whether the producer will continue production or shut down the firm. In this situation, firm's main aim is to minimise losses. Firm will not be shut down as long as firm is able to minimise its loss by continuing production.

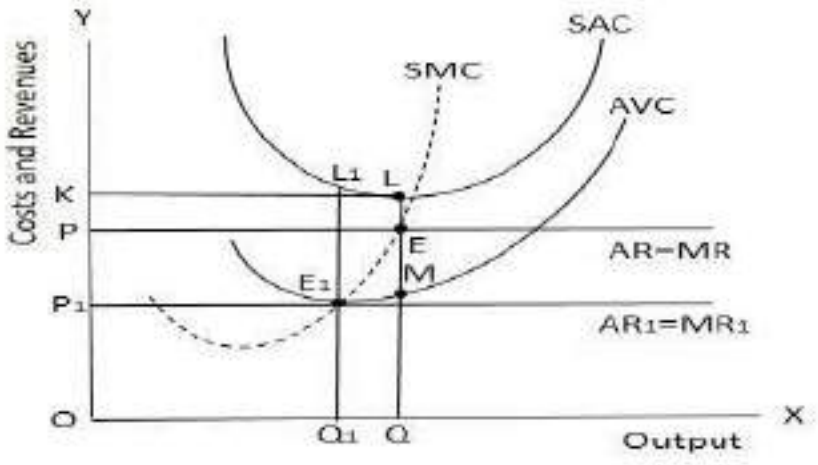


Figure 10: Equilibrium with Losses

In figure 10, firm is incurring losses at equilibrium point E but firm will not be shut down as firm is able to minimise losses at this point. At equilibrium point E, OP is equilibrium price and OQ is equilibrium output. With equilibrium price OP, firm is able to cover entire average variable cost MQ and some part of average fixed cost EM. If firm has been shut down at this point, the entire average fixed cost must have converted into losses. Atthis point, firm is able to minimise losses by continuing production. Suppose price has declined to OP_1then firm will be in equilibrium at E_1. At E_1, L_1Q_1 is average cost out ofwhich $E_1Q_1$is average variable cost and E_1L_1 is average fixed cost. The price OP_1 covers only average variable cost E_1Q_1. No part of average fixed cost is being covered. Hence, there is no possibility of minimisation of losses in future. So, firm will be shut down at point E_1. In short time period, the condition for firm's shut down point is price should be equal to minimum average variable cost i.e. Price = minimum AVC. In figure 10, the condition for firm's shut down point is fulfilled at point E_1. Therefore, E_1 is the shut-down point of the firm in short- run.

7.4.4.2 Short-run Equilibrium of Industry

During short time period, it is not possible to establish new firms in the industry. It is also not possible for new firms to enter the industry and old firms to leave the industry within such a limited time. Hence, the number of firms remains fixed during short run. The cost conditions for all the firm are identical and price of product is given. If all the firms of an industry are in equilibrium, then industry will also be in equilibrium. If one firm is in equilibrium with super-normal profits then all the other firms and industry will be in equilibrium with super- normal profits. If a single firm's equilibrium is determined with losses then other firms aswell as entire industry will in equilibrium with losses. If an individual firm's equilibrium is attained with normal profits, then all other firms and whole of the industry will be inequilibrium with normal profits. In short time period, there is very less possibility thatindustry is in equilibrium with normal profits as the adjustments that are needed to attain normal profits cannot take place within short span of time. Therefore, short-run equilibriumof industry can take place either with super-normal profits or losses.

7.4.4.3 Long-run Equilibrium of Firm and Industry

In long run, industry will be in equilibrium when there is no possibility either to expand or contract its output. The changes in the output of an industry can take place because of two reasons. Firstly, when existing firms of an industry either increase or decrease their output. Secondly, the entry of new firms may expand the output of an industry and industry's output may contract because some firms have left the industry. In long-run, for an industry to be in equilibrium, all the existing firms should be in equilibrium. As all the firms have identicalcost conditions so if one firm is in equilibrium then all other firms will also be in equilibrium.In long-run, the conditions for firm's equilibrium are:

- MC=MR and
- MC must cut MR curve from below.

If firm is in equilibrium with super-normal profits in short-run, new firms will enter into the industry which will expand the output of an industry. In this situation, firms are in equilibrium but industry is not in equilibrium. Similarly, if firm is in equilibrium with losses in short-run, some existing firms will leave the industry which will contract the output of an industry. In this situation, firms are in equilibrium but industry is not in equilibrium.

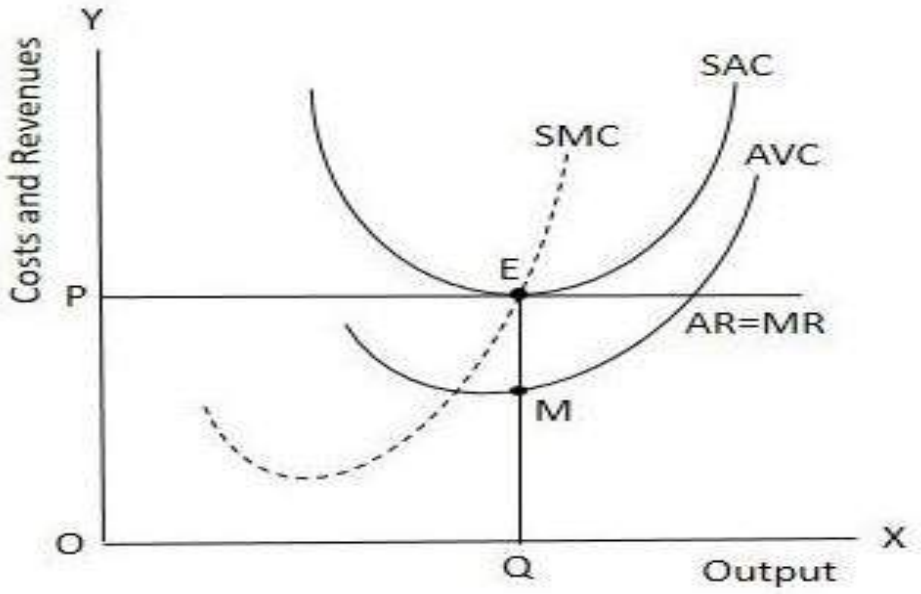


Figure 11: Equilibrium with Normal Profits

For an industry to be in equilibrium in long-run, there are two conditions. Firstly, all the firms of an industry must be in equilibrium. Secondly, the firms must not enter or leave the industry. For existing firms to be in equilibrium, marginal cost must be equal to marginal revenue i.e. MR=MC. If firms earn normal profit then no firm can enter or leave theindustry. For a firm to earn normalprofits, average cost must be equal to average revenue i.e. AC=AR. Therefore, two conditions for long-runequilibrium of firm and industry are

(i) MR=MC and

(ii) AC=AR. In perfect competition, AR=MR,so, condition can be written as:

Price (AR) =MR=MC=AC

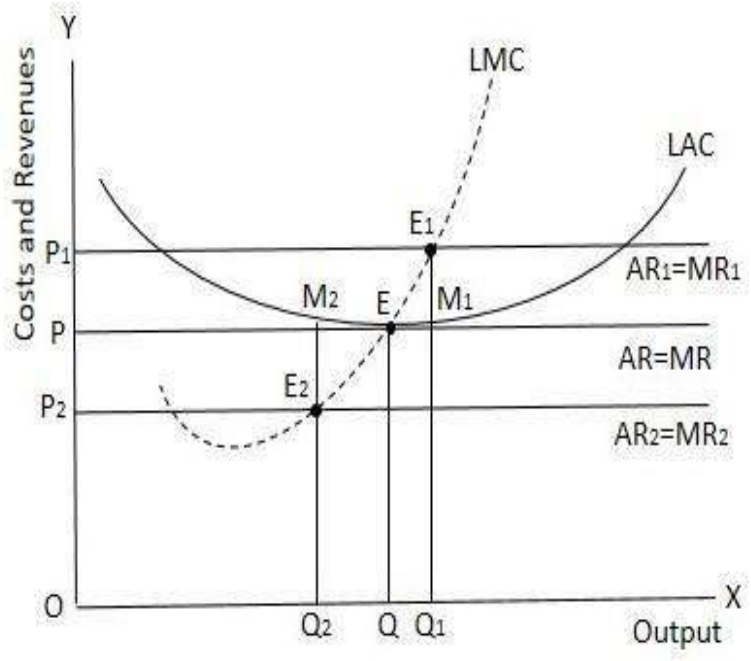


Figure 12: Long-run Equilibrium under Identical Cost Conditions

Marginal cost curve cuts the average revenue curve at lowest point. Therefore, above condition can be restated as:

Price (AR) =MR=MC= Minimum AC

The equilibrium of firm as well as industry in long-run under identical cost conditions has been explained in figure 12. LAC is long-run average cost curve and LMC is long-run marginal cost curve. At price OP_1, AR_1 and MR_1 are average revenue and marginal revenue curves, respectively.

Equilibrium is attained at E_1 where MC=MR and OQ_1 is output. At E_1, price OP_1 is higher than average cost M_1Q_1 by E_1M_1. E_1M_1 is super-normal profit per unit which leads to entry of new firms in the industry. At E_1, firms are in equilibrium but industry is not in equilibrium as AR>AC. At price OP_2, AR_2 and MR_2 are average revenue and marginal revenue curves, respectively. Equilibrium is attained at E_2 where MC=MR and OQ_2 is output. At E_2, price OP_2 is lower than average cost M_2Q_2 by E_2M_2. E_2M_2 is per unit loss which will induce some firms to leave the industry. At E_2, firms are in equilibrium but industry is not in equilibrium as AC>AR. At price OP, AR and MR are average revenue and marginal revenue curves, respectively. Equilibrium is attained at E where MC=MR and OQ is output. At E, price OP is equal to average cost EQ i.e., AR=AC. At E, firms as well as industry are in equilibrium as MC=MR=AR= minimum AC.

7.4.3 Equilibrium of Firm and Industry under Different Cost Conditions

The equilibrium of firm and industry under different cost conditions can be studied under short time period as well as long time period.

7.4.3.1 Short-run Equilibrium of Firm

In perfect competition, all the firms may not have same cost conditions rather there can be difference in cost conditions of various firms because of heterogeneity of different factors of production. If all the units of factors of production are homogenous, still the difference in cost conditions exists due to heterogeneity of entrepreneurs. Therefore, some firms will have lower costs as they are more efficient than other firms. With given price and different cost conditions, some firms will be in equilibrium with super-normal profits and other firms will either be having losses or normal profit at the point of equilibrium. In case of different cost conditions, equilibrium of firm in short time period can be attained by fulfilling following two necessary conditions:

- MC = MR
- MC curve must cut marginal revenue curve from below.

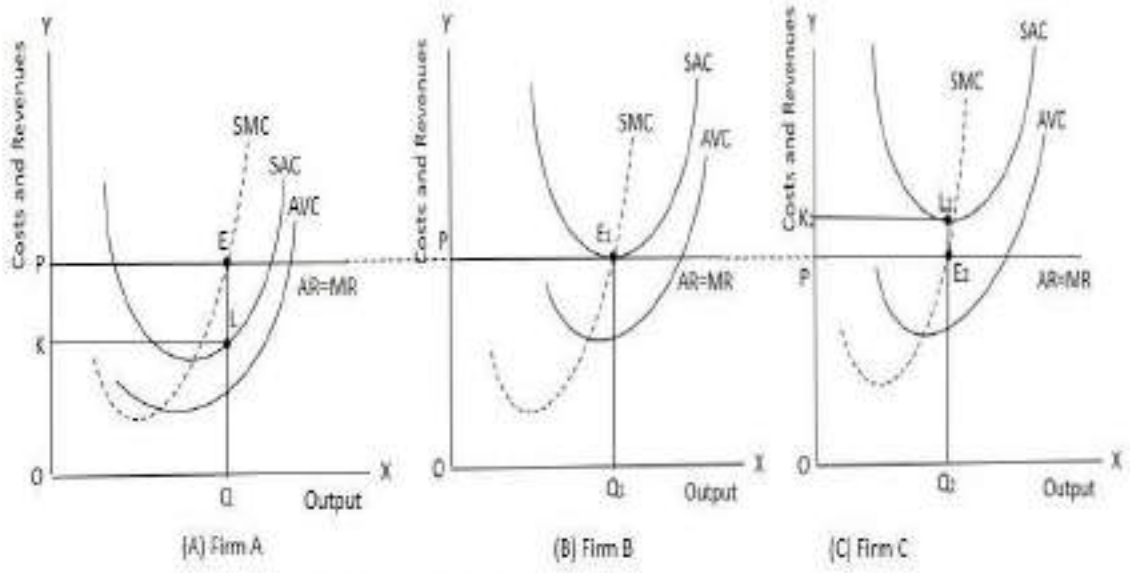


Figure 13: Short-run Equilibrium under Different Cost Conditions

There are three firms in the industry i.e. Firm A, Firm B and Firm C. In short run, there is no tendency for entry and exit of the firms. The most efficient firm is Firm A which has the lowest costs. Firm B is less efficient than Firm A and more efficient than Firm C. The costsof Firm B is higher than Firm A and lower than Firm C. The Firm C is the least efficient and has the highest costs. The short-run equilibrium of firm under different cost conditions has been explained in figure 13. In this figure, output is measured on X axis and costs and revenues on Y-axis. SAC, SMC and AVC are short-run average cost, short-run marginal cost and average variable cost curves, respectively. AR is average revenue curve and MR is marginal revenue curve.

In figure 13 (A), Firm A is most efficient and has the lowest costs. The firm is in equilibrium at point E as at point E, MR=MC and MC curve cuts MR curve from below. OQ is the equilibrium level of output. The total revenue is OP×OQ = OPEQ. The total cost is LQ×OQ = LQOK. The firm will be earning super-normal profits as total revenue is more than total cost i.e. OPEQ > LQOK. The difference between total revenue and total cost is super-normal profit i.e. OPEQ – LQOK = KLEP. In figure 13 (B), Firm B is less efficient than Firm A and has costs higher than Firm A. The firm is in equilibrium at point E_1 as at point E_1, MR=MC and MC curve cuts MR curve from below. OQ_1 is the equilibrium level of output. The total revenue is $OP \times OQ_1 = OPE_1Q_1$. The total cost is $E_1Q_1 \times OQ_1 = OPE_1Q_1$. The firm will be earning normal profits when total cost is equal to total revenue i.e. OPE_1Q_1. In figure 13 (C), Firm C is less efficient than Firm B and has

costs higher than Firm B. The firm is in equilibrium at point E_2 as at point E_2, MR=MC and MC curve cuts MR curve from below. OQ_2 is the equilibrium level of output. The total revenue is $OP \times OQ_2 = OPE_2Q_2$. The totalcost is $L_2Q_2 \times OQ_2 = L_2Q_2OK_2$. The firm will be incurring losses as total cost is more thantotal revenue i.e. $L_2Q_2OK_2 > OPE_2Q_2$. The difference between total cost and total revenue is losses i.e. $L_2Q_2OK_2 - OPE_2Q_2 = K_2L_2E_2P$.

Therefore, some firms earn super-normal profit, some other earn normal profits and still others incur losses while attaining short-run equilibrium under different cost conditions.

7.4.3.2 Short-run Equilibrium of Industry

The industry will be in equilibrium in short-run under different cost conditions if all the existing firms of an industry are in equilibrium. In figure 13, at given price OP, the equilibrium outputs of Firm A, Firm B and Firm Care OQ, OQ_1 and OQ_2, respectively. The industry's equilibrium output will be the summation of output of all the three firms. As different firms earn super-normal profit, normal profit and incur losses, their summation will decide whether industry will be in equilibrium with super-normal profits or losses. Therefore,short-run equilibrium of industry under different cost conditions exists either with super- normal profit or losses.

7.4.3.3 Long-run Equilibrium of Firm and Industry

The various firms operate under different cost conditions in long-run due to heterogeneity of various factors of production. To discuss long-run equilibrium of firm and industry under different cost conditions, the concept of marginal firm is of utmost importance. Marginal firmis the firm which is the least efficient and has the highest costs. This firm will be earning

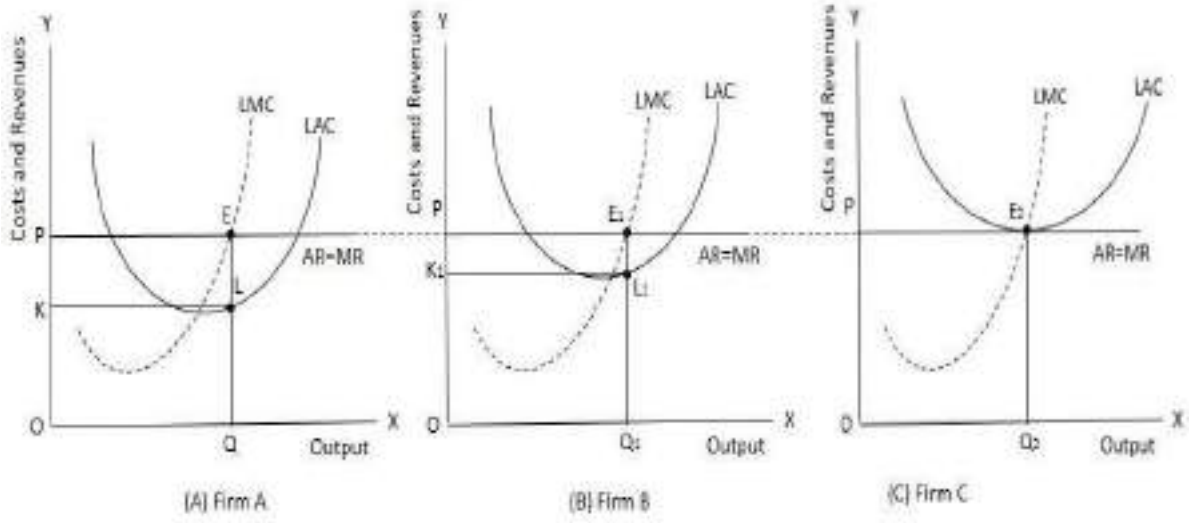


Figure 14: Long-run Equilibrium under Different Cost Conditions

normal profits so whenever there is decline in price, marginal firm will be the first firm to leave the industry. Those firms which are more efficient than marginal firm are regarded as intra marginal firms and will be earning super-normal profit. The two necessary conditions for long-run equilibrium of firm and industry under different cost conditions are (i) MR=MC of allthe firms and (ii) Price (AR) = AC of the marginal firm. There are three firms i.e. Firm A, FirmB and Firm C in a specific industry. Firm A is the most efficient and has the lowest costs. Firm B is less efficient than Firm A and has higher costs than Firm A. Both Firms A and B are regarded as intra marginal firms and earning super-normal profits. The Firm C is the least efficient and has the highest costs. Firm C is regarded as marginal firm and earning normal profit. If there is slight decline in the price, Firm C will be the first to leave the industry. The long-run equilibrium of firm and industry under different cost conditions has been explained infigure 14. In this figure, at price OP, AR is average revenue curve and MR is marginal revenue curve for all the firms. LAC and LMC are long-run average cost and long-run marginal cost curves, respectively. Firm A is the most efficient and has the lowest costs. Firm B is less efficient than Firm A and has higher costs than Firm A. The Firm C is the least efficient and has the highest costs. Firm C is regarded as marginal firm and earning normal profit. In case of Firm C, price is exactly equal to long-run average cost E_2Q_2. If price declines slightly belowOP then Firm C will be the first to leave the industry. Both Firms A and B are regarded as intramarginal firms and earning super-normal profits. In case of Firm A and Firm B, equilibrium is attained at E and E_1, respectively as at these points MC=MR. In figure 14 (A), Firm A is most efficient and has the lowest costs. The firm is in equilibrium at point E and OQ is theequilibrium level of output. The total revenue is OP×OQ = OPEQ. The total cost is LQ×OQ = LQOK. The firm will be earning super-normal profits as total revenue is more than total cost

i.e. OPEQ > LQOK. The difference between total revenue and total cost is super-normal profit

i.e. OPEQ – LQOK = KLEP. In figure 14 (B), the Firm B is in equilibrium at point E_1 and OQ_1 is the equilibrium level of output. The total revenue is $OP \times OQ_1 = OPE_1Q_1$. The total cost is $L_1Q_1 \times OQ_1 = L_1Q_1OK_1$. The firm will be earning super-normal profits as total revenue is more than total cost i.e. $OPE_1Q_1 > L_1Q_1OK_1$. The difference between total revenue and total cost is super-normal profit i.e. $OPE_1Q_1 - L_1Q_1OK_1 = K_1L_1E_1P$. In figure 14 (C), Firm C is marginal firm. This firm is in equilibrium at point E_2 and OQ_2 is the equilibrium level of output. The total revenue is $OP \times OQ_2 = OPE_2Q_2$. The total cost is $E_2Q_2 \times OQ_2 = OPE_2Q_2$. The firm will be earning

normal profits as total revenue is equal to total cost i.e. OPE_2Q_2. Firm A and Firm B, both are earning super-normal profits but super-normal profit is higher in case of more efficient firm i.e. Firm A. Figure 14 has shown that all the firms are in equilibrium. The marginal firm is earning normal profit so there is no tendency for other firms to enter or leave the industry. Therefore, if all the firms i.e. Firm A, Firm B and Firm C are in equilibrium then industry is also in equilibrium. As intra-marginal firms are in equilibrium with super-normal profit then long-run equilibrium of industry under different cost conditions is also attained withsuper-normal profits.

Check Your Progress-II

Q1. Mention the conditions necessary to attain short-run equilibrium of a firm.

Ans:_____

_____

Q2. List the necessary conditions to attain long-run equilibrium of firm and industry.

Ans:_____

_____

7.5 Summary

In this unit, the concept of perfect competition, its features and effects of changes in demand and supply on price have been discussed. The price determination in market time period, short time period and long time period have also been explained. Moreover, the equilibriumof firm and industry under identical as well as different cost conditions have been analysed. Perfect competition is a market situation in which there exists large number of buyers and sellers selling identical products. In this market form, there is free entry and exit of firms, absence of transportation cost, perfect mobility of factors of production and perfect knowledge among buyers and sellers. The two necessary conditions to attain short-run equilibrium of an individual firm are (i) MC=MR (ii) MC must cut MR curve from below. The two necessary conditions to attain long-run equilibrium of firm and industry are (i) MC=MR (ii) AC=AR. In short time period, firm can earn super-normal profits, normal profits and incur losses. Super-normal profit exists if firm's average revenue is more than average cost. When average revenue is exactly equal to average cost then firm is earning normal profits. If average cost is more than average revenue then firm must be incurring losses. Under identical cost conditions, industry will be in equilibrium with normal

profits in long-run.

7.6 Questions for Practice

A. Short Answer Type Questions

Q1. Explain the various features of perfect competition.

Q2. Describe the effects of simultaneous changes in demand and supply on price.

Q3. Discuss the price determination in market time period with the help of suitablediagrams.

Q4. Explain long-run equilibrium of firm and industry under identical costconditions.

Q5. Discuss short-run equilibrium of firm and industry under different costconditions.

B. Long Answer Type Questions

Q1. Give the meaning of perfect competition. How is price determining under perfect competition?

Q2. How price and output of a firm is determined in perfect competition.

Q3. Discuss the price determination in short and long run under perfect competition.

Q4. Explain Long-run Equilibrium of Firm and Industry under different costconditions with the help of diagram.

Q5. Discuss equilibrium of Firm and Industry under Different Cost Conditions forshort period.

Q6. Explain equilibrium of Firm and Industry under Identical Cost Conditions forshort and long period.

7.7 Suggested Readings

- H.L. Ahuja: Advanced Economic Theory (Microeconomic Analysis)
- Koutsoyiannis: Modern Microeconomics
- K.N. Verma : Micro Economic Theory

BACHELOR OF ARTS

SEMESTER –I

COURSE: MICRO ECONOMICS

UNIT 8: IMPERFECT COMPETITION: MONOPOLY AND MONOPOLISTIC COMPETITION

STRUCTURE

8.0 Learning Objectives

After the completion of this unit, learner will be able to:

- Define the Monopoly and Monopolistic Competition.
- Determine the price and equilibrium under Monopoly and MonopolisticCompetition.
- Measure the Monopoly Power
- Determine the price under discriminating Monopoly
- Understand the selling cost and excess capacity
- Compare the Monopoly competition and Monopolistic Competition

8.1 Introduction

In economic terms, imperfect competition is a market situation under which the conditions necessary for perfect competition are not satisfied. The concept of imperfect competition was firstly explained by the Economist Mrs. Joan Robinson in 1933 in her book "Economics of Imperfect Competition". There are four types of imperfect markets. These markets are:Monopoly (only one seller), Oligopoly (few sellers of goods), Monopolistic competition (many sellers with highly differentiated product) and Monopsony (only one buyer of aproduct).

8.2 Monopoly: Meaning and Features

The word Monopoly is the combination of two words: Mono (single) and Poly (Control). It means Monopoly is a competition where there is only one or a single/producer seller of thecommodity in the market and there is no close substitution of that commodity. For example, in Punjab, there is only one seller of electricity i.e., Punjab State Electricity Board and electricity has no close substitution in the market. In a monopoly, difference between firm and industry does not exist.

According to Koutsoyiannis, "Monopoly is a market situation in which there is a single seller.

There are no close substitutes of the commodity it produces, there are barriers to entry". As per Ferguson, "A pure monopoly exists when there is only one producer in the market. There are no dire competitions."

Features/Assumptions

Following are the main features of monopoly competition:

1. Under monopoly, there is a single seller or producer of the commodity but has largenumber of buyers.
2. There no close substitution of the produced commodity in the market.
3. There are some restrictions on the entry of the new firm. These restrictions can be inthe form of natural or artificial.
4. Monopolist is the price maker and has full control on the supply of product. He cancharge different price from different buyer for the same product.
5. There is only one firm and difference between firm and industry does not exist.

8.2.1 Nature of Demand and Revenue Under Monopoly Competition

Under Monopoly, firm's demand curve constitutes the industry's demand curve because thereno difference between firm and the industry. In this market, both average revenue (AR) as well as marginal revenue (MR) curves slopes downward from left to right. AR slopesdownward, it means if producer fixes high price, then demand will decrease and vice-versa.

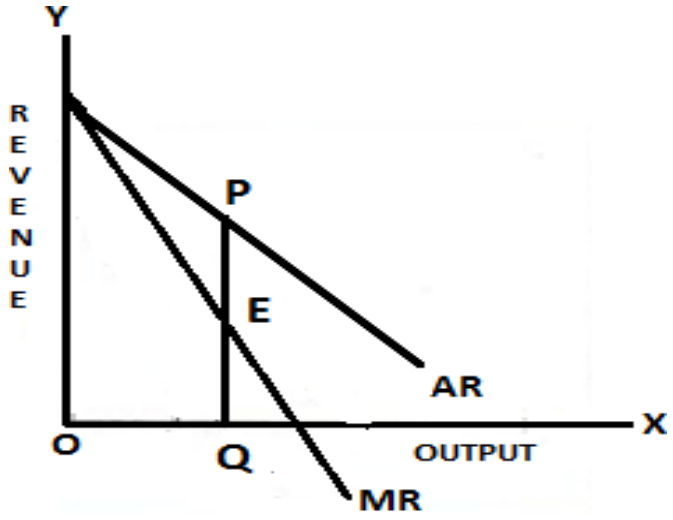


Fig 1

In Fig. 1, on the X-axis, output and on Y-axis, revenue has been measured. AR is average revenue curve and MR is marginal revenue curve. Both are sloping downward from left to right whereas MR is below the AR curve showing that at OQ output, average revenue (AR)or Price is PQ and marginal revenue (MR) is EQ. In other words,

AR>MR or PQ>EQ.

8.2.2 Determination of Price and Equilibrium Under Monopoly

Following are the two approaches to determine the price and equilibrium under monopoly competition:

8.2.2.1 Total Revenue and Total Cost Approach

With total revenue and total cost approach, monopolist will get maximum profit where the difference between the TR and TC is maximum and this is an equilibrium situation for him. This approach can be explained the help of figure 2. This shows that TC is total cost curve, TR is total revenue curve and CC' is profit curve. TR curve stars from the origin O (indicates that when output is zero, then TR is also zero) and TC starts from P (indicates that TC includes both FC and VC and if producer discontinues its output, he has to bear the loss of fixed cost). CC' starts from C showing initially producer bears the losses but when producer starts production, TR increases. However, in the beginning, the rate of increase in TR is less than TC. Therefore, BC part of CC' curve shows that producer is incurring losses. At thepoint BE, total revenue is equal to total cost, it means producer is working on break-even point (Break-even point is that situation where producer has no profit no loss, here his TR=TC). When producer increases his output more than BE point, TR will be more than TC and CC'' slopes upward. It shows that firm is earning profit. When CC' curve will reach its highest point E, then the producer will be earning maximum profits. The amount of output i.e OQ will be called equilibrium output. If the producer will produce the output after equilibrium output, than his profits will go on diminishing and again he will reach at break-even point i.e. BE'. If the producer produces more than BE', then TR will be less than TCand producer will incur loss.

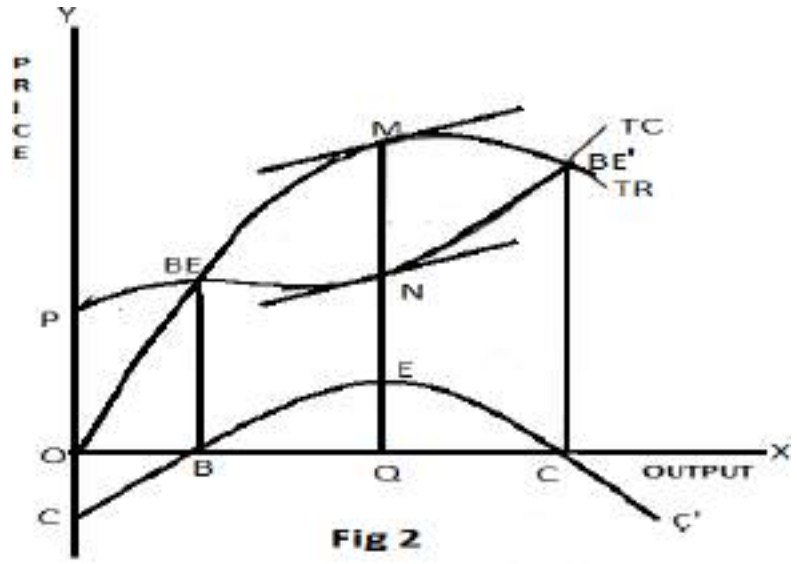


Fig 2

8.2.2.2 Marginal Revenue and Marginal Cost

According to this approach, monopolist will be in equilibrium and earn maximum profits when MC=MR and MC curve cuts MR from below. It can be explained with the help of diagram:

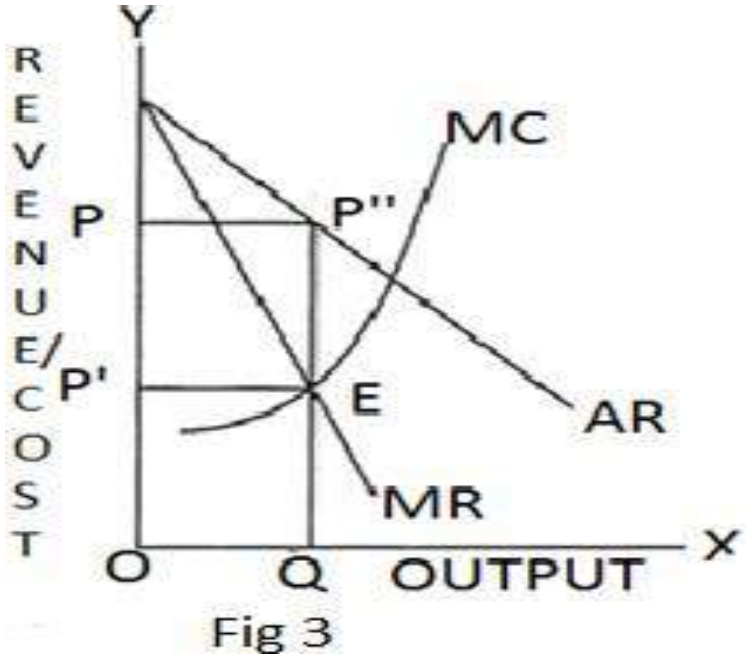


Fig 3

In fig 3, output is shown on X-axis and revenue/cost on Y-axis. MC is marginal cost, AR average revenue and MR is marginal revenue curves. At the point E, MC=MR and MC curve cuts MR curve from below so this point is an equilibrium point and OQ is the equilibrium output.

Check Your Progress - I

Q1. Define Monopoly.

Ans. .....

Q2. Give any two features of monopoly.

Ans. .....

8.2.3 Price and Output Equilibrium in Short-run Period

Short run is that period of time when monopolist/producer cannot change the fixed factorslike land, building etc but can change the output with the help of variable factor like labour. Under short run period, monopolist can face following three situations:

A. Super Normal Profit: If the price/Average Revenue (AR) of the product is more than itsAverage Cost (AC), then monopolist will get the super normal profits. In other words: super normal profit=AR>AC. The producer will produce upto the level where MR (at this point he will be in equilibrium situation).

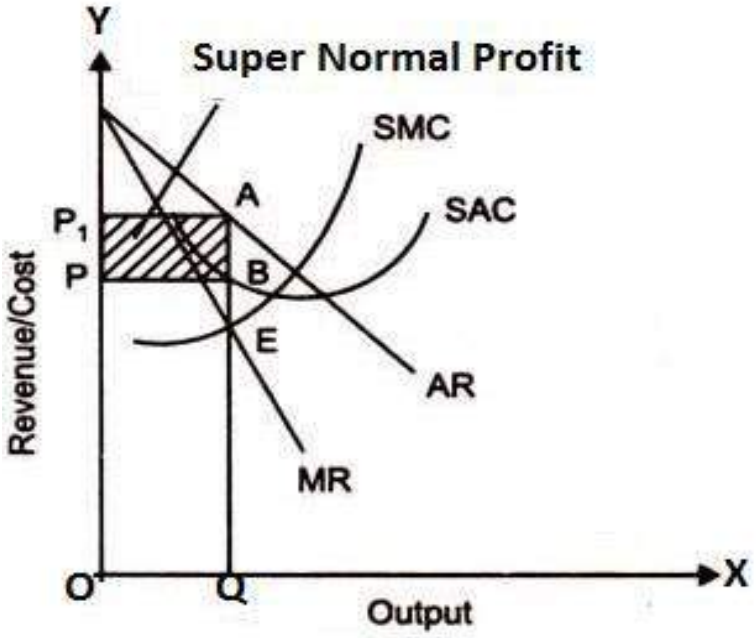


Fig 4

In fig 4, output is measured on X-axis and revenue/price is on Y-axis. SAC and SMC are short run average cost and short run marginal cost curves whereas AR and MR are average revenue and marginal revenue curves respectively. The monopolist is in equilibrium at the point E where MC=MR and MC cuts MR from below (at this point both conditions are fulfilled so this is an equilibrium point). At this level, monopolist produces OQ output and sells it at AB price which is more than average cost BQ by AB (AQ-BQ). Thus, in this situation monopolist will earn super normal profits i.e. ABPP'.

B. Normal Profit: If the price/Average Revenue (AR) of the product is equal to its AverageCost (AC), than monopolist will get the normal profits. In other words: normal profit=AR=AC.

In fig 5, output is measured on X-axis and revenue/price is on Y-axis. SAC and SMC are short run average cost and short run marginal cost curves whereas AR and MR are average revenue and marginal revenue curves respectively. The monopolist is in equilibrium at the point E where MC=MR and MC cuts MR from below (at this point both conditions are fulfilled so this is an equilibrium point). At this level, monopolist produces OQ output. At this level of output, average cost touches average revenue curve at the point A (it means price OP is equal to the average cost AQ. Therefore, monopolist will earn normal profit at the point.

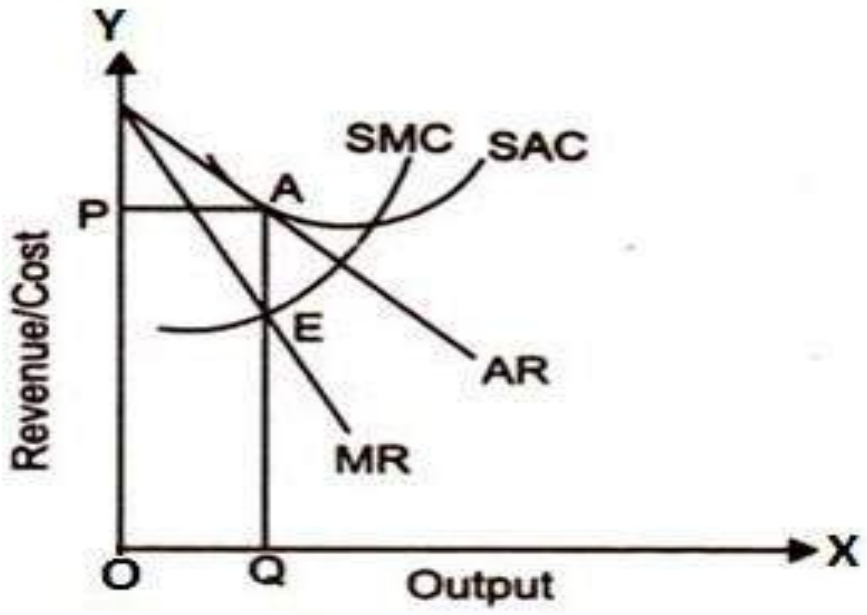


Fig 5

C. Losses: The monopolist may have to bear losses in the short run period if the price/Average

Revenue (AR) of the product is less than its Average Variable Cost(AVC). Once the price falls below the AVC, monopolist will stop the production.

In fig 6, output is measured on X-axis and revenue/price is on Y-axis. SAC and SMC are short run average cost and short run marginal cost curves whereas AR and MR are average revenue and marginal revenue curves respectively. The monopolist is in equilibrium at the point E where MC=MR and MC cuts MR from below. The monopolistwill produce OQ level of output and sells it at OP. At OP price, AVC touches the AR curve at point B. It shows that producer will cover only AVC from the prevailing price. At OP point, he will bear loss of fixed cost i.e. AB per unit and total loss ABPP'. If the price decreases below OP, the producer will stop the production.

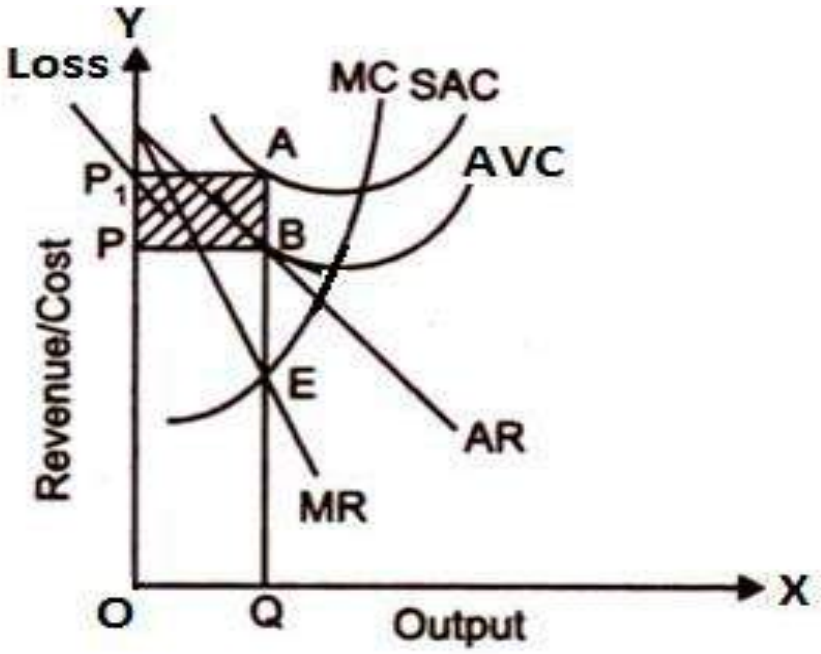


Fig 6

8.2.4 Price and Output Equilibrium in Long Run Period

In long run, monopolist will be in equilibrium when long run marginal cost is equal to marginal revenue. In this situation, he will try to earn super normal profit and fix the price to get it. In other words: Super Normal Profit (Long run)=AR>LAC.

In fig 7, output is measured on X-axis and revenue/price is on Y-axis. LAC and LMC are long run average cost and long run marginal cost curves whereas AR and MR are average revenue and marginal revenue curves respectively. The monopolist is in equilibrium at the point

E where MC=MR and MC cuts MR from below (at this point both conditions are fulfilled so this is an equilibrium point). At this level, monopolist produces OQ output and sells it at AB

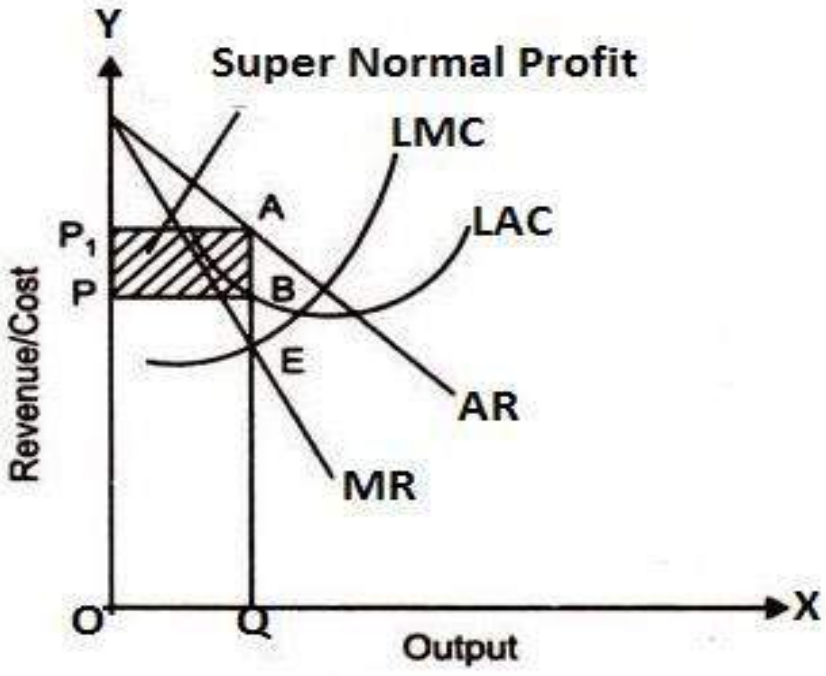


Fig 7

price which is more than average cost BQ by AB (AQ-BQ). Thus, in this situation monopolist will earn super normal profits i.e. ABPP'.

8.2.5 Monopoly equilibrium and Laws of Cost

There are three laws of cost i.e., law of diminishing cost, increasing cost and constant cost which effect the price of the product:

A. Diminishing Cost: This law is also known as law of increasing return. According to this law, production increases and cost per unit declines. In this situation, producer must sell his product at low price to increase its sales. In Fig 8 AC and MC are falling.The MC and MR cut each other at point E. So, the monopolist will produce OT units of commodity and sell the same at QT Price and gets PQRS profit.

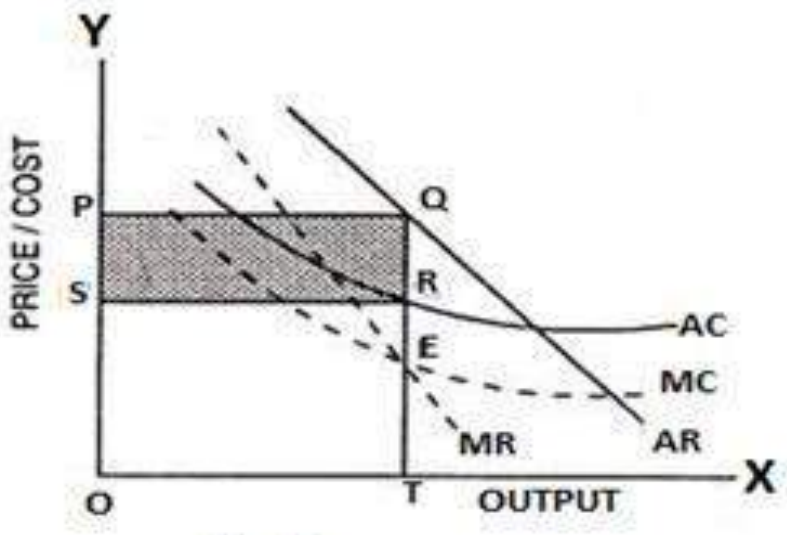


Fig 8

B. Increasing Costs: This law is also known as decreasing return to scale, under this situation producer will get the maximum profit at point E (indicated in the fig 9), where marginal revenue marginal costs are equal to each other (MR=MC). The producer will produce OT units of the commodity at QT price and will get profits from PQRS.

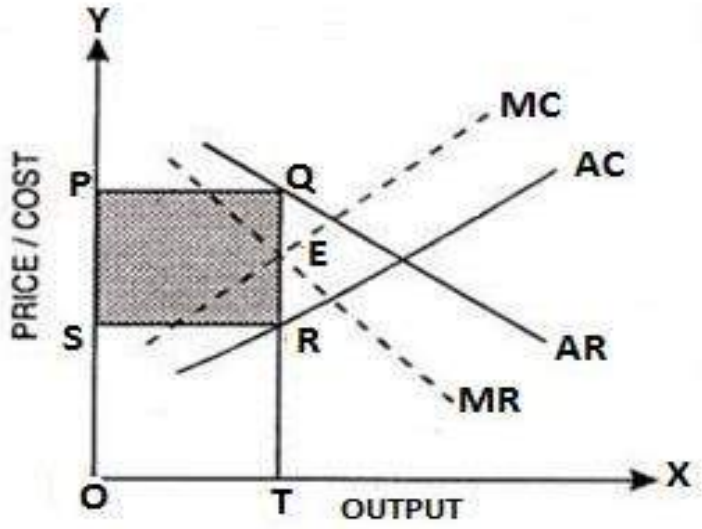


Fig 9

C. Constant Costs: In this situation, cost will remain the same whether production is less or more. In the fig 10, the AC curve will be parallel to OX and for all the levels of output ACwill be equal to MC. AR and MR represent the average revenue curve and marginal revenue curve

respectively. The equilibrium of firm is at point E where MC=MR and OTis the equilibrium output with QT Price. The monopoly profit will be equal to PQRE.

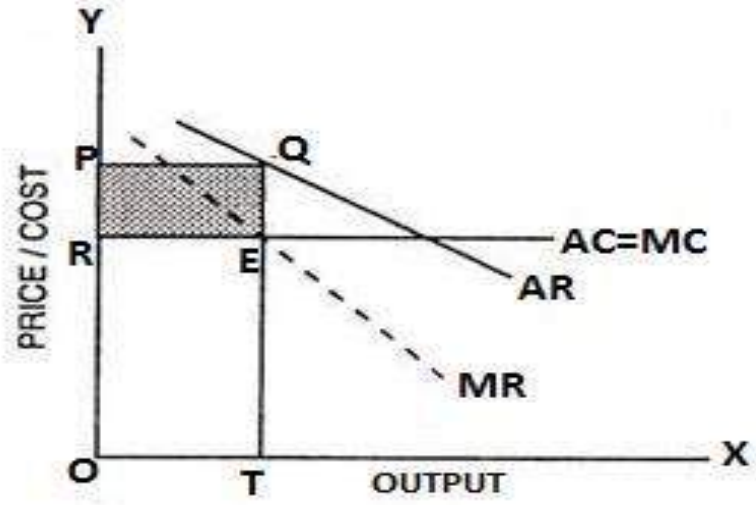


Fig 10

8.2.6 Degree of Monopoly Power

Measurement of monopoly power depends upon various factors but commonly there are two methods for measuring it:

A. **Lerner's Measure:** According to this, monopoly power is the difference between the price and the marginal cost. It means larger the difference between these two, larger the monopoly power and less the difference between these two, less the monopoly power. Following is the formula for measuring the monopoly power:

$$MP = \frac{\text{Price-Marginal Cost}}{\text{Price}}$$

B. **J.S.Bain:** According Prof J.S.Bain, monopoly power is the difference between the price and average cost.

Check Your Progress - II

Q1. Discuss the determination of price and output under monopoly long period.

Ans._____

_____

Q2. Define Monopoly Power.

Ans._____

_____

8.2.7 Price Discrimination/Discrimination Monopoly: Meaning and Types

Price discrimination refers to selling the same commodity or product at different prices to different buyers. In other words, if a monopolist charges different prices from different consumers for the same commodity is called price discrimination or discriminating monopoly. For example, when a producer charges Rs. 1,000 for a chair from X customer andRs. 800 from customer Y for the same chair, then producer is practicing price discrimination.

According to Robinson, "Price discrimination is charging different prices for the sameproduct or same price for the differentiated product."
According to Stigler, "Price discrimination is the sale of various products at prices which arenot proportional to their marginal costs." In the words of Dooley, "Discriminatory monopolymeans charging different rates from different customers for the same good or service." **Types**: Price discrimination is of the following kinds:

A. **Personal Price Discrimination:** It refers to charging of different prices from different customers for the same product. For example, if a doctor charges different price/fee ofhis services from rich and poor patients then it is called personal price discrimination.
B. **According to use**: When different prices are charged for different uses to which the commodity is put, for example, rate of electricity for domestic use is costly than for commercial purposes.
C. **Area-wise Discrimination**: when the monopolist charges different prices at different places for the same product, it is called as area-wise or geographical discrimination. Thistype of discrimination is also called dumping.

8.2.7.1 Degrees and Conditions of Price Discrimination

Prof. Pigou has divided the degrees of price discrimination into three categories:

- **First Degrees**: In the first degree of price discrimination, the monopolist can sell each separate unit of product at a different price. The seller charges exactly the price the buyer wants to pay.

This means that the seller does not leavea discount/surplus to the consumer. This type of price discrimination is called perfect discrimination. This is the ‘take-it-or-leave-it’ price discrimination.

- **Second Degree**: In this degree, the buyers are divided into different categories andfrom different categories different price is charged which is the lowest demand price of that group.
- **Third Degree:** In this degree, the market is divided into several smaller markets or sub-markets, and from each market different price is charged. The price charged in a small market or sub market depends on production and the conditions of demand for that small market.

Price discrimination is possible when the following conditions exist in the market:

- **Single Seller or Producer of a Commodity**: Price discrimination is only possible under the monopoly market structure where there is a single seller or producer of a commodity or service. In other types of market structure, it is not possible.
- **Two Separate Markets**: There should be two or more than two separate markets in which product or commodity is being sold. They shouldn't be close to each other.
- **Different Elasticity of Demand:** The price difference indicates that the demandthe two markets. The monopolist can set the highest market price w here flexibility isless and also the lowest market price where flexibility is more elastic.
- **Nature of the Product:** The nature of the product or service must be such thatit cannot be resold. Otherwise, you cannot discriminate on the basis of price.
- **Ignorance of Buyers:** Price discrimination is possible if the buyer is lazy and does not know the market conditions, the monopolist will charge different buyers different prices for their products or services. Sometimes customers are lazy and don’t care about the slightest difference in product and service offerings.
- **Sale on Order:** Price discrimination is also possible when a single seller sells his product on order.
- **Legal Acceptance**: When a monopolist has legal sanction from the government to sell its product at different prices then the price discrimination is possible. For example, PSEB has legal sanction from the government to charge different prices for the use of electricity in agricultural sector and industrial sectors.
- **Various uses**: Price differences can also occur when users of a service or product have

different uses. For example, Indian Railways charge different freight rates for coal and silver.

8.2.7.2 Price and Output Determination Under Price Discrimination

We know that under price discrimination, monopolist charges different prices from a different consumer for the same product. For that purpose, he will divide the entire market into sub-markets on the basis of the elasticity of demand for the product. Only if the elasticity of demand is different, price discrimination will be profitable. After dividing the market, the monopolist has to decide: (1) how much the total output should be produced? (2) How the total output should be distributed between the sub-markets? And (3) what prices should be charged in each of sub-market? In order to explain it, suppose there are two different markets

i.e A and B having different elasticity of demand.

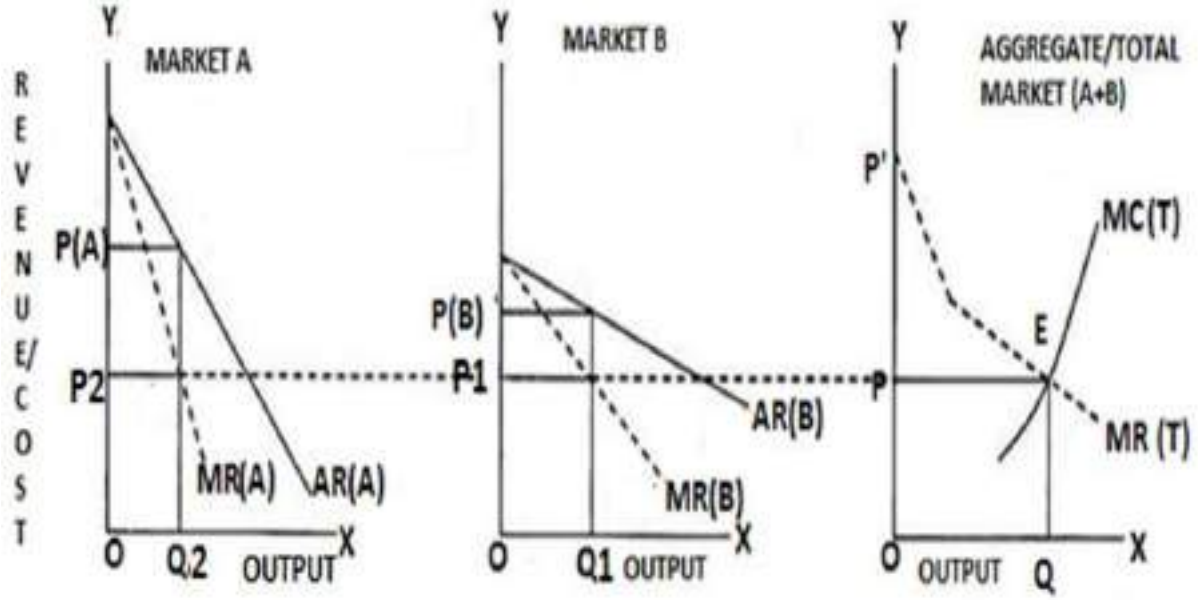


Fig 11

The monopolist has to decide at what level of output he should produce to get maximum profit, hence, he will be in equilibrium at output at which MR=MC and MC curve cuts the MR curve from below. It is assumed that the product is homogenous. In the above fig 11, marginal revenue curve of A market and of B market is expressed by MR(A) and MR(B) whereas average revenue curve of A market and of B market is expressed by AR(A) and AR(B) respectively. The total

marginal revenue (MC(T)) curve includes marginal cost of market A and market B whereas MR(T) is the combination of marginal revenue of both A and B markets. Thus, the total output is fixed at that point where MC (T)=MR(T) and MC(T) cuts MR(T) from below. Therefore, the equilibrium of the discriminating monopolist isestablished at output OQ at which MC (T) cuts MR (T). In other words, he will produce OQ output. For dividing the total output (OQ) into two markets, the discriminating monopolistwill distribute it in such a way that marginal revenue in each is equal to the marginal cost of whole output (which is equal to OP). Therefore, he will sell output OQ2 in market A and OQ1in market B.

The elasticity of demand is different in each market, so monopolist will charge different prices in both the markets. It is also shown that in Market B in which elasticity of demand is greater, the price charged is lower than that in Market B where the elasticity of demand isless. So OQ2 output will be sold at price OP(A) in market A and OQ1 output at OP(B) in market B.

8.2.7.3 Price Determination Under Dumping

Dumping occurs when monopolist sells his product in domestic country at high price and in foreign country at low price. In other words, in this case of price discrimination, producer charges lower price in the foreign market and high price in the domestic country as he enjoys monopoly in domestic country and faces perfect competition in foreign market. The demand curve for the product will be perfectly elastic for him where he faces perfect competition, while demand curve will be sloping downward where he enjoys monopoly. This can be explained with the help of figure

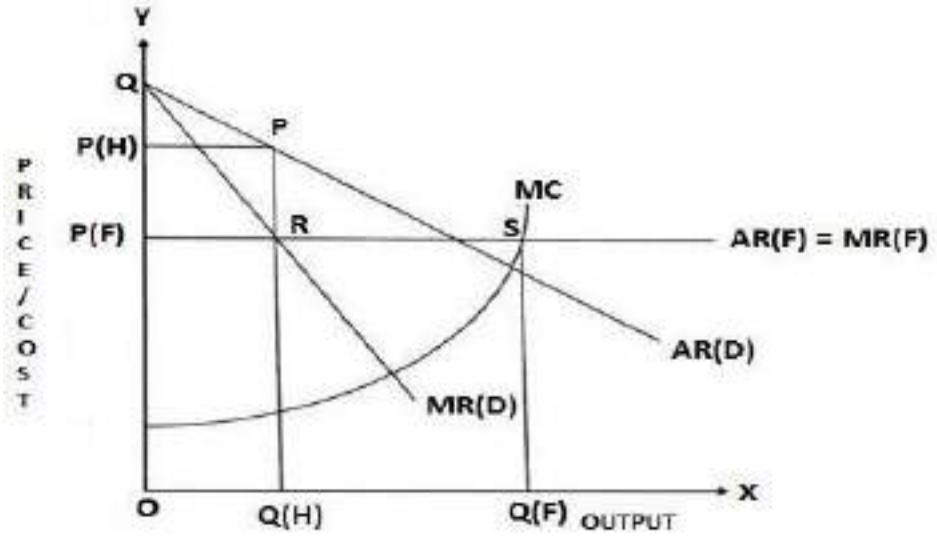


Fig 12

In the domestic market in which the producer has a monopoly, average revenue curve AR (D)as well as marginal revenue curve MR(D) are sloping downward. In the foreign market, producer faces perfect competition so AR(F) curve will be a horizontal straight line and the MR(F) curve will coincide with the AR(F) curve. MC is the marginal cost curve of outputand the aggregate marginal revenue curve is represented as QRS.

The fig shows that the marginal cost curve MC intersects the MR curve at point S.Therefore, an equilibrium output OQ(F) is determined. The total OQ (F) output is distributed betweenthe foreign and the domestic market in such a manner that the Marginal revenue in each market is equal to each other. The producer will sell OQ(H) output at OP(H) price indomestic country and Q(H)Q(F) output at OP(F) price in the foreign country. Here OP(H)>OP(F)but marginal revenue in both countries is equal.

Check Your Progress – III

Q1. Define dumping.

Ans. ----------

Q2. What do you mean by price discrimination?

Ans. .....

8.3 Monopolistic Competition: Meaning and Features

The term monopolistic competition was given by Prof Edward H. Chamberlin of Harvard University in 1933 in his book Theory of Monopolistic Competition. The term monopolistic competition represents the combination of monopoly and perfect competition. Monopolistic competition refers to a market situation in which there are a large number of buyers and sellers of products. However, the product of each seller is different in one aspect or the other and these products have close substitutes. For example, there are many well-known brands in soap like Lux, Rexona, Dettol, Dove, Pears, etc.

According to J.S. Bains, “Monopolistic competition is market structure where there is a large

number of small sellers, selling differentiated but close substitute products."

According to Baumol, "The term monopolistic competition refers to the market structure in which the sellers do have a monopoly (they are the only sellers) of their own product, butthey are also subject to substantial competitive pressures from sellers of substitute products."

Features: Following are the features of monopolistic competition:

1. **Large Number of Sellers and Buyers:** The size of sellers and buyers is large in monopolistic competition. Each firm follows the independent price policy. The buyers do not have perfect knowledge about all the products, their qualities and prices.
2. **Differentiated Products:** Under monopolistic competition, the products of sellers are different in many respects, like difference in brand, shape, colour, style, trademarks, durability, and quality. Therefore, buyers can easily differentiate among the available products in more than one way. However, under monopolistic competition, products are close substitutes of each other.
3. **Free Entry and Exit:** Under monopolistic competition, there are no restrictions imposed on firm for their entry and exit from the market. This is the same condition as prevailing under perfect competition.
4. **Restricted Mobility of Factors of Production:** Under monopolistic competition, the factors of production as well as goods and services are not perfectly mobile. This is because if a firm/producer is willing to move its factors of production or goods and services, it has to pay heavy transportation cost. This leads to difference in the prices of products.
5. **Price Policy:** Similar to monopoly, average and marginal revenue curves of an organization also slope downward in case of monopolistic competition. This implies thata firm can sell more only if the prices are low of those products. On the other hand, under monopolistic competition, if the prices of products are higher, then the buyers would switch to other sellers due to close substitutability of products.
6. **Selling cost**: Each and every firm tries to promote their product by spending on advertisements and publicity. The purpose of this cost is to maximise their profits.

7.3.1 Nature of Demand and Cost Curves Under Monopolistic Competition

Under monopolistic competition due to product differentiation, a firm faces a downward sloping demand curve. It is highly elastic but not perfectly elastic. The reason is that if the firm increases

price of their product, then buyer will stop buying their product and shift to another firm who has not changed his price. On the other hand, if firm decreases the price of product, then he will attract new buyers. Under monopolistic competition, average cost, average variable cost, marginal cost and selling cost are of U-shaped. Due to differences in product, supply curve cannot be drawn. Fig 13 shows average revenue and marginal revenue curve under monopolistic competition.

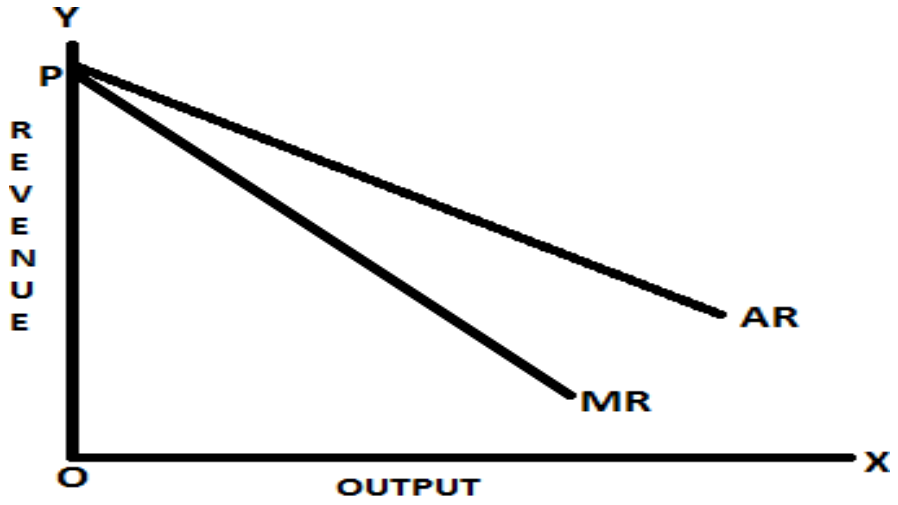


Fig 13

Check Your Progress – IV

Q1. Define monopolistic competition.

Ans. ----------

Q2. Give any two features of monopolistic competition.

Ans. ----------

8.3.2 Price and Output Determination Under Monopolistic Competition (Individual Equilibrium

A. Short Run: The short-run equilibrium of a monopolistic competitive organization is the same as under monopoly. The firm will be in equilibrium at that point where marginal revenue equals

marginal cost and MC cuts MR from below. In short run, a firm can get super normal profits, normal profits and losses:

(i) Super Normal Profit: Under monopolistic competition, a firm will enjoy the super normal profits where MC=MR and MC cuts MR from below**.**

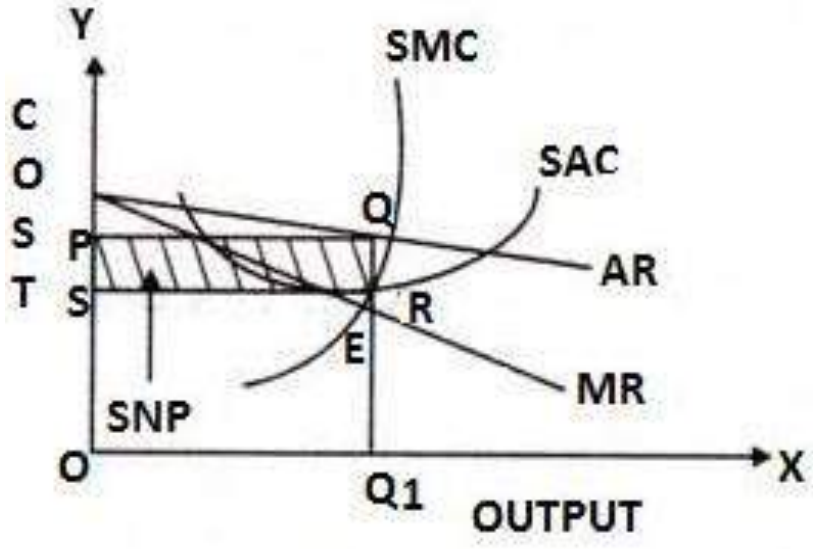


Fig 14

In Figure 14, output is measured on X-axis and cost/revenue/price is on Y-axis. AR is the average revenue curve, MR represents the marginal revenue curve, and SAC curve represents the short run average cost curve, while SMC signifies the short run marginal cost. It can be seen that MR intersects SMCat point E (E point is equilibrium point where MR=MC and MC cut MR from below) which showed output OQ1and price isOP (which is equal to QQ1). Therefore, QR is the supernormal profit per unit of output as supernormal profit per unit of output is the difference between the average revenue and average cost and supernormal profit would be measured by the area of rectangle PQRS.

(ii) Normal Profit: A firm will earn normal profits when the price of product is equal to average cost of the same product.

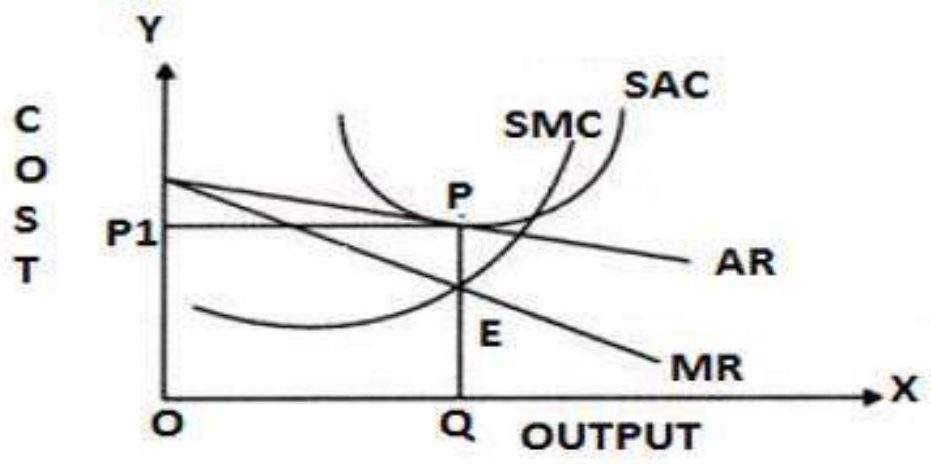


Fig 15

In Figure 15, output is estimated on X-axis and cost/revenue on Y-axis. SMC indicates short run marginal cost whereas SAC short run average cost. E is the equilibrium point where SMCintersects MR from below and SMC=MR. At this equilibrium point, the equilibrium output isOQ and price OP1. The curve AR touches SAC at point P (AR=SAC), thus this P point is normal profit earning point for a firm.

(iii) Losses: In short run period when short run average cost is greater than average revenue,a firm will incur losses, as shown in figure 16.

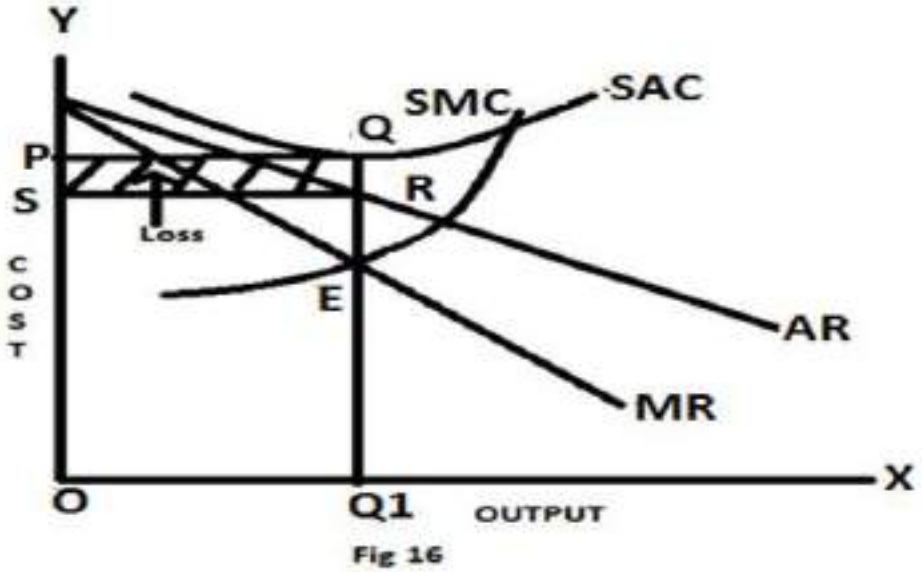


Fig 16

Figure 16, output is measured on X-axis and cost/revenue/price is on Y-axis. The firm is in equilibrium at point E, where MC=MR. At this equilibrium level the output is OQ1 at price OP.

Corresponding to this, the average cost QQ1 is greater than average revenue RQ1. Hencerevenue is less than cost; the firm will incur loss which is PQRS.

B. Long Run: Under monopolistic competition, in long run if existing firms are earning super normal profits, then new firms will enter in the industry. With the entering of new firms, production will increase as a result price will decline. Hence each and every firm will earn normal profit in long run period instead of super normal profits. Now profits are normal only when AR = LAC. It is further explained with the figure 17:

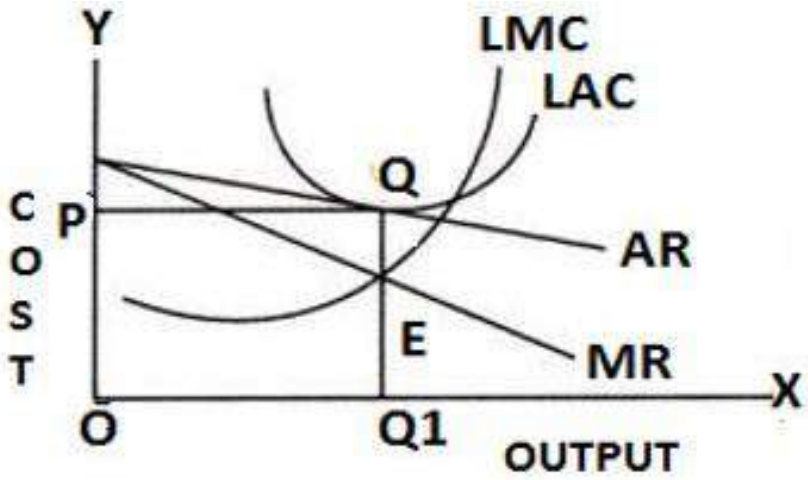


Fig 17

In Figure 17, output is estimated on X-axis and cost/revenue on Y-axis. LMC indicates long run marginal cost whereas LAC long run average cost. E is the equilibrium point where LMCintersects MR from below and LMC=MR. At this equilibrium point, the equilibrium output isOQ1 and price OP. The curve AR touches LAC at point P (AR=LAC), thus this Q point is normal profit earning point for a firm.

8.3.3 Price and Output Determination Under Monopolistic Competition (Group Equilibrium)

Generally, group is related with the industry. The industry includes all firms which are producing homogenous product. Whereas under monopolistic competition, group consists of a firm producing differentiated product and have close substitute. For instance, soap making firms like Lux, Dove, and Pears are a group. Following are the assumption of group equilibrium:

- Demand and cost curve of all the firms are identical.

- No firm will affect the price and output of another competitive firm.

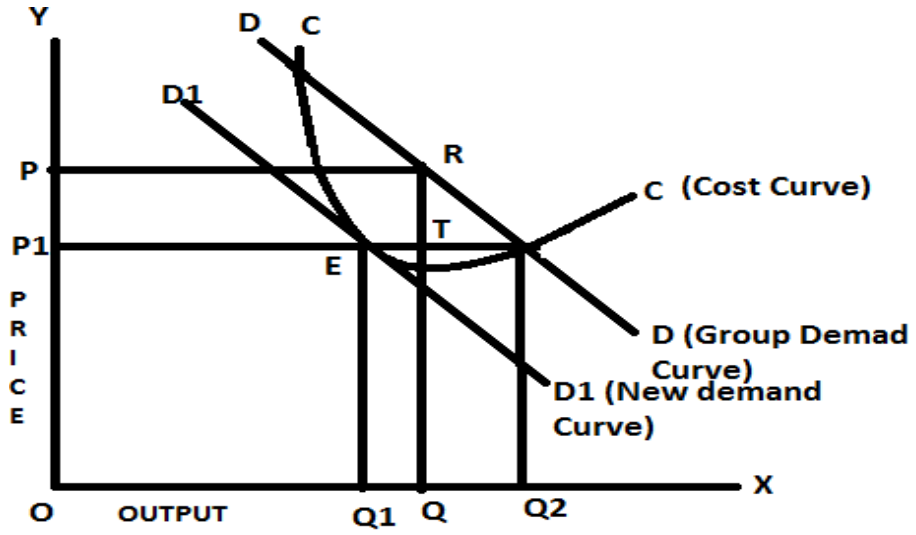


Fig 18

Figure 18, shows output is measured on X-axis and price is on Y-axis. If all firms fix OP price of the product, then they will earn supernormal profit i.e. PRTP1. This supernormal profit will attract the other firms to enter into the market. Then new firms will also start the output as a result production will increase in the market and the firm's new demand curve will be shifted to D1D1.The demand curve is tangent to the cost curve at E point (which is equilibrium point) and all firms will earn normal profits at this situation. Hence the equilibrium price is OP1 and output is OQ1.

8.3.4 Selling Cost

The curve of selling costs was propounded by Prof. Chamberlin. Under monopolistic competition, products are differentiated; therefore, producers have to push up the sales of their product. For this purpose, producers do the publicity regarding the products or try to promote their product. Such a sales promotion expenses are known as selling cost. This cost includes all the promotion expenses like advertisement on television, newspapers, radio and salaries of salespersons incurred by the producers to increase the demand of their product.The selling cost is different from production cost because production cost is related with the expenses incurred by the producer for the production of a product. The production cost includes all the expenses on manufacturing of a product like raw material, electricity, wages of labours and transportation cost (not included in selling cost as this cost do not increase the demand of a product) etc. Like the cost curves, selling cost curve is also U- shaped under the influence of the law of variable proportions.

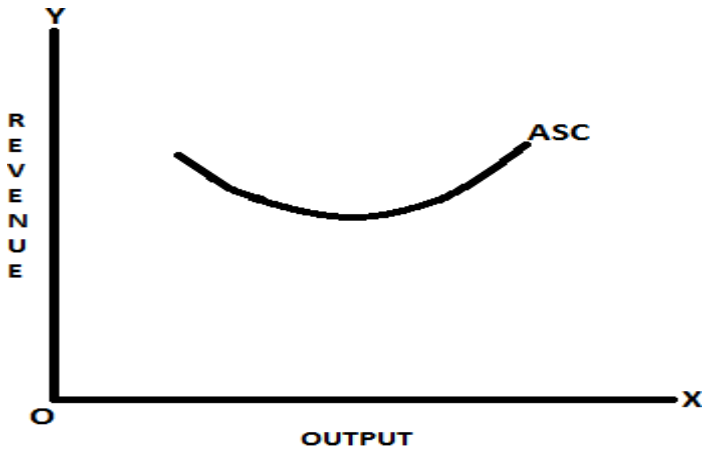


Fig 19

Figure 19, shows the slopes of ASC is average selling cost. In the initial stage, it falls because proportionate increase in sale is more than the increase in selling cost. Later, it starts rising asit indicates that after a point proportionate increase in sale is less than the selling cost.

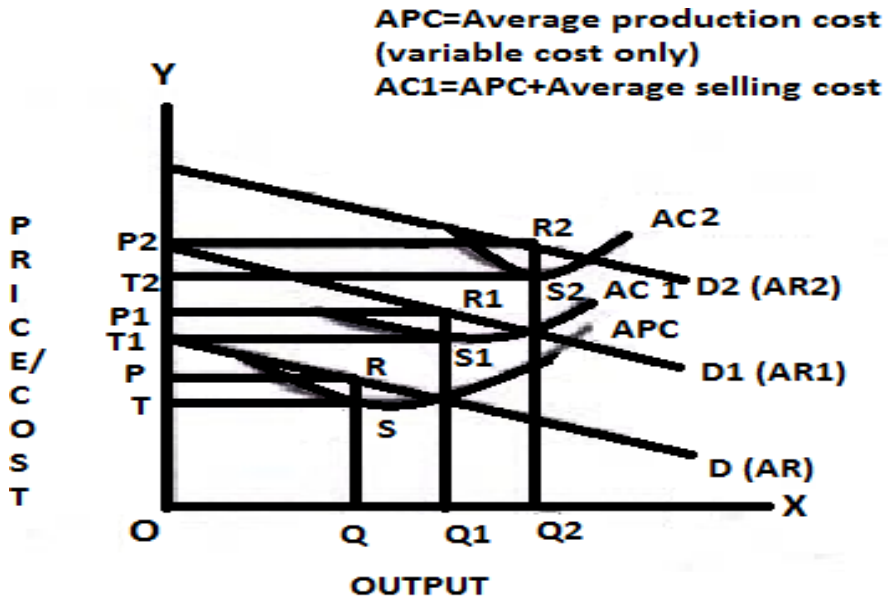


Fig 20

Under monopolistic competition, the selling cost also effect the price-output of a firm. Figure 20 show that output is measured on X-axis and cost/revenue is on Y-axis. APC is initially average production cost and AC1 (average composite curve) includes average production cost and average selling cost whereas AC2 includes average composite cost and additional average selling cost. The initially equilibrium position is when OQ output is sold at OP price. The firm earns PRST super-normal profits. Now, when selling costs are incurred in the first instance, the new equilibrium

position brings T1S1R1P1 profits (after selling cost demand will also increase and new demand curve will be D1 (AR1)) by selling OQ1 output at OP_1 price. Again, if firm increases the selling cost, then demand curve will shift to D2 (AR) and firm will get P2R2S2T2 super normal profits by selling OQ2 output at P2 price. The firmwill, however, continue to increase the selling cost to maximize their profits. If the firm spends more on advertisement beyond this level, the addition to revenue will be less than costs.

8.3.5 Excess Capacity

Initially, the excess capacity was outlined by Wicksell and Cairnes but later on it waspropounded by Chamberlin in a systematic way. The doctrine of excess capacity is concernedwith monopolistic competition in the long-run. It is defined as "the difference between ideal (optimum) output and the output actually attained in the long-run."

Under perfect competition, average revenue/demand curve touches long-run average costcurve (LAC) at its minimum point and two conditions i. e.

(i) LMC = MR and

(ii) AR (price) = Minimum LAC are fulfilled.

This means that in the long-run the entry of new firms forces the existing firms to make the best use of their resources to produce at the lowest point of average total costs. Figure 21 show the firm will be in equilibrium situation at the point E (at this point conditions are where OQ is the ideal or optimum output and enjoys profits in long run.

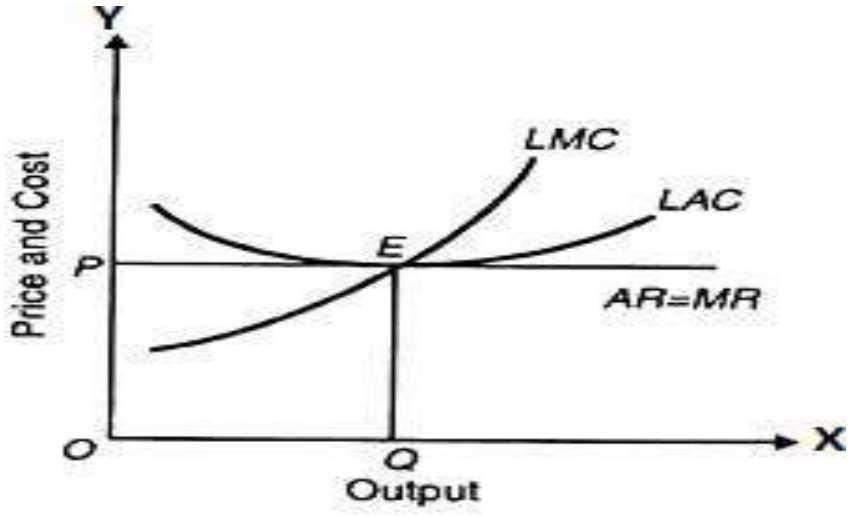


Fig 21

Under monopolistic competition, average revenue or demand curve slopes downward and two conditions i. e. (i) LMC = MR and (ii) AR (price) = Minimum LAC are not fulfilled. Thus, under this competition, firms work under excess capacity means they are not producing optimum output. Figure 22 show that output is measured on X-axis and price/cost is measured on Y-axis. ARis

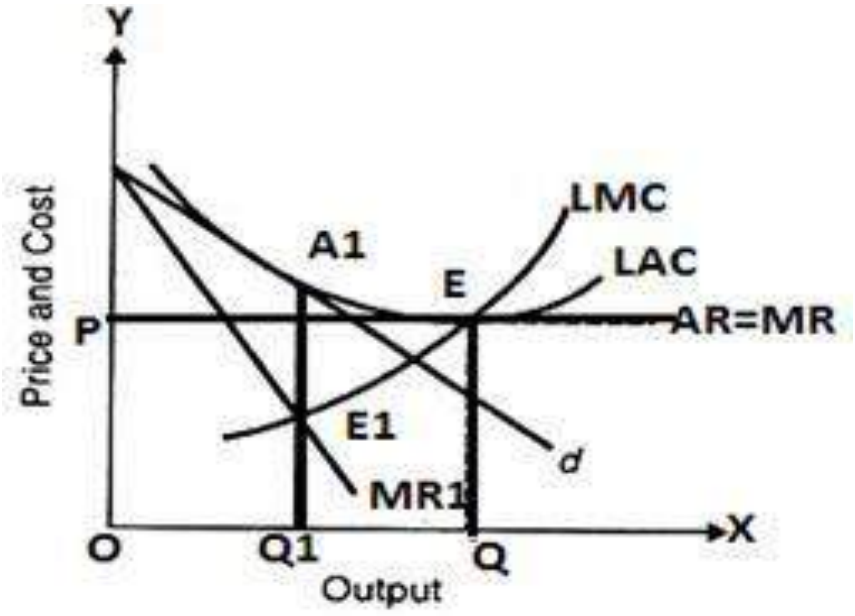


Fig 22

average revenue, MR is marginal revenue, LAC is long run average cost and LMC is long run marginal cost. The demand curve is indicated by d and firm is in equilibrium at the point E1 and output is OQ1 but this is not the ideal output because d is tangent to LAC at A1 to the left of E. If firm want to produce beyond OQ1 then it will incur losses as LMC>MR1. Hence,excess capacity (QQ1) under monopolistic competition cannot be utilise.

Chamberlin's Excess Capacity: In previous concepts of excess capacity, it is discussed that under perfect competition, each firm produces at the minimum pointon its long run average cost curve and demand curve is tangent to it at that point.

This will be the ideal output and no excess capacity exits in perfect competition. Whereas under monopolistic completion, in long rundemand curve slopes downward and equilibrium of the firm is to the left of the minimum point on long run average cost curve. Thus, firm cannot utilise its excess capacity. But according to Prof. Chamberlin under monopolistic competition there is a freedom of entry and price competition, the tangency point between thefirm's demand curve and

the long run average cost curve would lead to be the "ideal output" and no excess capacity. Prof Chamberlin assumes (1) there is a large no of firms. (2)Each firm produces similar product (3) there is freedom to enter in the production process. (4) Long-run cost curves are of U-shaped.

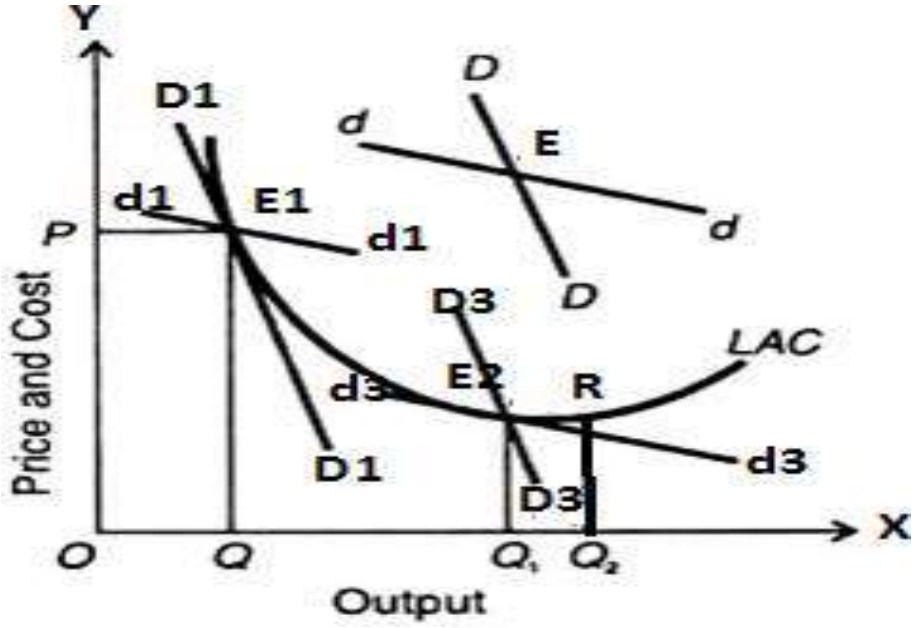


Fig 23

Figure 23 shows due to no price competition dd curve does not any importance whereas DD is a group demand curve. Further, this fig shows that at E point firms are earning super normal profits in short run period. The super normal profits attract new firm to enter in the market resulting DD shifted to D1D1 where it is touches the LAC at the point E1. At the point E1, firms earn normal profit without price competition and selling OQ output at price OP.According to Chamberlin due to non-price competition under monopolistic competition each firm in the group producing OQ output but OQ1 is the ideal output or the excess capacity.

8.4 Comparison Between Monopoly and Monopolistic Competition

Following are the main point that shows there is difference between these two competitions:

1) **Number of buyers and sellers**: Under monopoly, there is only single producer/seller whereas in monopolistic competition, there are many sellers/producers. Both competitions have many buyers.
2) **Product:** Product may or may not be homogenous under monopoly on the other hand; there

is always a product differentiation.

3) **Barriers to entry:** Monopoly is characterized by the existence of barriers to entry. There are no barriers to entry in monopolistic competition.
4) **Degree of knowledge:** The buyers and sellers have perfect market knowledge; on the other hand, under monopolistic competition, the sellers and buyers have not perfect market knowledge.
5) **Revenue curves:** Under monopoly AR and MR curves are less elastic whereas these are more elastic in monopolistic competition.
6) **Profits:** Under both competitions in short run period, a firm can earn super normal profits, normal profits and losses whereas in long run period, under monopolistic competition, a firm can earn normal profits and monopolist earn super normal profits.

Check Your Progress – V

Q1. Define selling cost.

Ans:_____

_____

Q2. Define Excess capacity

Ans:_____

_____

8.5 Summary

In this Unit, monopoly competition as well as monopolistic competition is discussed. Here, Monopoly competition is that competition where there is a single producer of the product and the product has no close substitution; on the other hand, in Monopolistic competition, there are many sellers but product differentiation exists. The monopolist will be in equilibrium and earn maximum profits when two conditions are fulfilled. These conditions are (1) MC=MR and (2) MC curve cuts MR from below. In the short run, monopolistic earn super normal profit, normal profit and losses whereas are in long run, he enjoy super normal profits. Monopolists cancharge different prices for the same product from different consumers under a discriminating monopoly. It may be due to personal, geographical or different uses of product. Price discrimination is possible only if the elasticity of demand in one market is different from elasticity of demand in

other market. Dumping is a special case of price discrimination wheremonopolistic charge high price in domestic country and low price in foreign country for the same product. The reason behind it is that in domestic country monopolist enjoys a monopoly and in foreign country he faces perfect competition. Under monopolistic competition, averagecost, average variable cost, marginal cost and selling cost are of U-shaped. Due to differencesin product, a supply curve cannot be drawn. A firm can earn supernormal profits, normal profits and losses in short run period whereas in long run period, it can earn normal profitsonly.

8.6 Questions for Practice

A. Short Answer Type Questions

Q1. Define Monopoly. Give its assumptions

Q2. Explain the term Monopolist is a price maker.

Q3. Explain the concept of total revenue and total cost under monopoly.Q4. What do you mean by price discrimination? Give example

Q5. Explain the shapes of AR and MR under monopoly and why?Q6. Discuss the degrees of Price Discrimination.

Q7. Explain the concept of excess capacity in detail.

Q8. Discuss Price and Output Determination Under Monopolistic Competition(Group Equilibrium)

Q9. Explain the nature of Demand and Cost Curves Under MonopolisticCompetition.

B. Long Answer Type Questions

Q1. Explain the term monopoly and how price determination under short and long period.

Q2. What is price discrimination? Explain its degrees and conditions.

Q3. Explain the price and output determination under price discrimination.Q4. Explain the meaning and features of monopolistic competition.

Q5. Explain price and Output Determination Under Monopolistic Competition (Individual Equilibrium).

Q6. Compare and contrast monopoly and monopolistic competition.

8.7 Suggested Readings

- H.L. Ahuja: Advanced Economic Theory (Microeconomic Analysis)
- Koutsoyiannis: Modern Microeconomics
- K.N. Verma: Micro Economic Theory